

TESTING OF A FIELD-FRIENDLY METHOD TO MEASURE THE POTENTIAL IMPACT OF FOOD SECURITY AND NUTRITIONAL INTERVENTIONS ON CHILD DEVELOPMENT IN BANKE, NEPAL

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Background

Dietary and nutritional exposures can have important impacts on children's developmental potential during the first 1,000 days and beyond. There is growing interest in directly measuring how different pathways and interventions influence child brain development. Most studies to date have been undertaken in clinical settings where the measurement of developmental outcomes is easier, but where malnutrition is less of a problem. Field friendly tools are needed that can lead to valid results and can be administered by trained enumerators as part of surveys to rural populations.

The Ages and Stages Questionnaire (ASQ) is a 30 question tool, designed to evaluate five different aspects (subscales) of child development:

- Communication
- Gross motor
- Fine motor
- Problem solving
- Personal-social

The tool consists of a set of questions about milestone attainment which are administered to a child's parent or primary caregiver and/or directly observed. The tool has been locally adapted in other populations but this is the first time it has been used in rural Nepal.

Study aims

Explore whether a locally adapted ASQ tool could feasibly be integrated as part of a home-based survey administered to rural households with reasonable internal consistency. Specific objectives of the study included:

- Develop a culturally adapted version of the Ages and Stages-3 Questionnaire for use in a Nepali context
- Explore the internal consistency of the ASQ-3 instrument for the 5 subscales and as a reflection of total child development
- Identify specific scale subcomponents (questions) potentially in need of further modification to improve the suitability of the tool for use in a Nepali context.



Methods

Population

The study was undertaken in a Banke District, Nepal, a remote area located in the far west of the country. Participants were randomly selected from a list of households participating in a trial testing the effects of a livestock-based livelihoods intervention in Banke Nepal. Eligibility criteria included participation in the trial and at least one child 23-39 months of age. The ASQ-3 tool was administered to 307 children ranging in age from 23 to 39 months.

Translation and local adaptation of the instrument

The Ages and Stages Questionnaire-3 is a 30-question tool, with 6 questions per subscale, as noted to the left. Scores for each subscale can then be used to generate an overall score reflecting total development. Some questions pertain to specific age groups while others are used for a wider age range and span multiple age groups. Questionnaires can be completed through interview of the caretaker or can also be administered using a home procedure that involves direct observation of skills by the enumerator.

We translated and adapted the questionnaires for five of the eight age groups of the tool: 23-26, 27-29, 30-32, 33-35 and 36-38 months were used in this study. The ASQ instrument was translated into Nepali and back translated into English by an English professor at Tribhuvan University, and back translations were discussed with the psychologists on our team and used to finalize the Nepali version of the questionnaire.



Cultural adaptation of the ASQ

A number of adjustments to specific items of the questionnaire were made prior to administering the questionnaire in a field setting, based on previous experience by one of the researchers. Some unfamiliar items and exercises (such as pushing a stroller) were adapted to be more familiar to participating children. Local kits were prepared for the survey teams to carry with them, including blocks, toy cars, reading books, beads, and other items.

Training, sampling and field administration

An experienced psychologist and pediatricians used hands-on exercises to train nine enumerators (3 male supervisors, 6 female enumerators) who had prior experience administering surveys but no prior experience assessing child development. In the field, data was collected in teams of two, and teams were supervised by staff from Heifer International. Teams carried toys and locally available materials needed to administer the survey. In most cases the survey took 15-20 minutes- in cases where parents were literate they were able to do it themselves. The ASQ was administered at the end of the survey after the household questionnaire for the trial. Households were randomly selected from a list of all participants in a trial and all children meeting age group eligibility within a household were sampled.

Statistical analysis

Data was coded according to the ASQ-3 manual. For missing items or items with no variation in responses, scale items were reweighted when calculating the total score for the subscale. Pearson product moment correlation coefficients were calculated between the subscales and the total ASQ-3. Standardized alpha values were calculated for the total score and for the five subscales for each age interval and interpreted according to the scale shown below each table. Data was analysed in SAS.

Results

Table 1. Household and child characteristics

Household characteristics	
Annual income (rupees, mean, sd)	55169+45937
Annual income per HH member (rupees, mean, sd)	8924+8605
Family size (mean, sd)	7.07+3.67
Educational attainment of household head (%)	
None	61
Some primary school	13
Primary school completed	5
Some secondary school	3
School leaving certificate achieved or above	4
Land owned (mean, sd)	26.17+31.26
Animal ownership score (mean, sd)	2.00+2.04
Child characteristics	
Female, %	49.8
Mean age [months, mean (sd)]	30.7 (4.8)
Age category n (%)	
34.5 - 39 months	83 (27%)
31.5-34.5 months	62 (20%)
28.5-31.5 months	44 (14%)
25.5-28.5 months	64 (21%)
23.0 - 25.5 months	54 (18%)

Table 2. Standardized alphas by total ASQ-3 scale and subscales

Age Interval	N	Communication Std. α	Gross motor Std α	Fine motor Std. α	Problem solving Std. α	Personal social Std. α	Total
35-39 months	83	0.19	0.67	0.72	0.42	0.46	0.67
32-34 months	62	0.51	0.43	0.72	0.58	0.58	0.82
29-31 months	44	0.75	0.65	0.61	0.68	0.51	0.73
25-28 months	64	0.58	0.66	0.40	0.58	0.27	0.74
23-25 months	54	0.56	0.54	0.29	0.39	0.49	0.75

Interpretation: α > 0.80=highly, 0.60-0.80=satisfactory, 0.40-0.60=moderate internal consistency

Table 3. Pearson product moment correlation coefficients between the subscales and the total ASQ-3 score (all ages)

	Communication	Gross motor	Fine motor	Problem solving	Personal social
Communication					
Gross motor	0.30314				
Fine motor	0.33221	0.32433			
Problem solving	0.41038	0.22791	0.39559		
Personal social	0.34928	0.43344	0.30624	0.40618	
Total	0.68173	0.64888	0.69141	0.70144	0.73549

Interpretation: 0.5 to 1.0=strong, 0.3 to 0.5=moderate, 0 to 0.3=weak correlation



Key findings

- A locally adapted version of the Ages and Stages Questionnaire was easy to administer in the context of surveys and can be administered at the home by enumerators with several days of training with moderate to good internal consistency.
- Including this tool in the survey added between 15 to 20 minutes on average and was found to be feasible by enumerators.
- One of the biggest challenges of administering the tool in people's houses was keeping siblings from interfering in the assessments. Extra toys were helpful in minimizing such distractions.
- Standardized alphas for all age groups and subscales ranged from 0.19 (communication amongst the oldest age group) to 0.75 (communication amongst 29-31 month olds), Table 2.
- The standardized alphas suggested satisfactory internal consistency of the tool for most age groups and subscales.
- Removing certain items from each subscale that negatively correlated with other items led to substantial improvements in the internal consistency of the scores suggesting the possibility for further improvements to the tool.

Recommendations and next steps

- Until now, anthropometry, particularly stunting, has been used as the primary developmental outcome in nutritional intervention studies and observational studies of the effects of poor diet in pregnancy and infancy/childhood in low income countries including Nepal.
- Psychometric tools such as the ASQ can be included in surveys to better understand the specific developmental consequences of undernutrition in Nepal and to directly measure the impacts of agricultural, early childhood development and other interventions on child development.
- More work is needed to continue to adapt some of the items identified in this study as having negative correlations with other items in each subscale or showing no variation within the population.
- The Nepali version of the questionnaires used in this study is available from the authors of this study (contacts below).

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