

## **Evaluation of Early Childhood Parenting Programs of Plan Bangladesh**

Frances E. Aboud  
ICDDR,B, Bangladesh  
McGill University, Canada

The synergistic effect of nutrition and psychosocial stimulation is now well accepted (Walker et al., 1991, 2000). This is most clearly demonstrated in the first three years of life when the child's brain is prepared to make its greatest gains in language acquisition and social-emotional development, but requires energy, proteins and micronutrients to consolidate learning. With 50% of children under-5 years in Bangladesh experiencing moderate to severe levels of malnutrition, and mothers largely illiterate and uninformed about the need for stimulation, there is concern that children may not be developing optimally. Without the necessary cognitive, language and social skills, children are less able to solve problems, cope with novelty, persist in overcoming obstacles, and actively engage in social interactions. They are less likely to benefit from schooling, and consequently achieve less productivity and health than would be possible with an education. To overcome the cycle of poverty and illiteracy, international and national organizations are developing guidelines and implementing programs to promote early childhood care and education (Evans, Myers, & Ifeld, 2000). While a number of programs exist, few have been systematically evaluated. This report describes the evaluation of a parenting program for mothers of under-3 children implemented by Plan Bangladesh in three rural districts.

To develop the full potential of the child, most research now points to the need to focus on children under the age of 3 years (DiPietro, 2000). While claims that change is not possible after this age are unfounded, nerve connections in the brain develop rapidly during these early years and reach a peak at 3 years. Behaviorally, this is the age when receptive and expressive language expand rapidly, as do trust in social relations and exploration of the environment. This is also the period when parents, and mothers in particular, develop an understanding of their child and the parenting skills that promote growth and mental development. Age-appropriate responsive stimulation has been identified as the most critical caregiver behavior for promoting child mental development, in addition to a secure emotional bond. In particular, caregivers' verbal responses to the child's exploration, vocalization, and play are known to be important for language and cognitive development (NICHD, 2001; Siraj-Blatchford et al., 2002; Tamis-LeMonda, Bornstein, & Baumwell, 2001). Mothers differ among themselves in the amount of responsive stimulation they offer their children as a function of variables such as the mother's education and the child's temperament (DiPietro, 2000). Yet, parenting skills are modifiable. A 3-month intervention in the Netherlands with mothers of difficult infants succeeded in teaching them how to be more sensitive and responsive, and in turn produced more emotionally mature children (van den Boom, 1995).

Most experts agree that the home is the most important context for children's early development. Especially in Bangladesh, where 50% of children are born with low birthweight, a stimulating environment can make the difference between whether the child quickly catches up with age-mates or continues to grow and function below the norm. Yet little is known about parenting practices in rural Bangladesh (Guldan et al., 1993). A recent survey found that almost half the rural mothers had no education, and that most were unaware of the importance of fostering

curiosity and self-confidence in a child (UNICEF, 2001). The most commonly mentioned maternal behaviors for promoting mental development in children under 3 years were giving nutritious food (26%) and teaching a child to talk (21%); providing opportunities for play, conversation, autonomy, and achievement were rarely mentioned. Sporadic home observations supported the survey findings. Consequently, rural and illiterate families need attention to prepare parents for their role as caregivers, which includes not only feeding and monitoring but also stimulation and social support (Richter, 2003). Parents in Bangladesh typically encounter the formal health sector for immunization during their child's infancy; however, they are unlikely to receive systematically any further service until the child enters primary school. Consequently, many parents are left to their own devices and traditions when raising young children. Parenting programs can fill this gap by providing new information and solutions to common child-rearing problems.

Plan Bangladesh has developed an innovative model of early childhood interventions to tackle the problems of poor physical, mental and social development of children from birth to 8 years in Bangladesh (Plan Bangladesh, 2003). The model combines the development of community capacity with promotion of parenting skills and child learning centers. The Parenting Program involves weekly or biweekly group sessions offered by trained mother volunteers to 20 or so women and adolescents in a village. The sessions lasting approximately 1 hour are largely informational, but utilize a number of different interactive learning strategies that encourage participation and recall of the messages. The contents of the message are based on a Parenting Manual that has recently been expanded from 20 to 40 child-rearing topics (Plan, 2002). They cover, among others, pregnancy, nutrition, stimulation, self-esteem, hygiene, diseases, disabilities and discipline.

Although a number of different programs exist around the world (Barnard van Leer Foundation papers; Evans et al., 2000), their curriculum and methods vary considerably. Not surprisingly, outcomes are mixed. In high-risk countries where child mortality is high, and access to health services and female literacy low, the curriculum usually focuses on child health, nutrition and psychosocial stimulation within the family context, while attending to the mothers' reproductive health and nutritional needs at the same time. One problem is the lack of a standard indicator for success, other than coverage. Given that the objective of most programs includes enhancing mothers' knowledge of child-rearing, this could be one indicator of success. However, mothers' practices are also expected to change, thereby promoting the child's development. Stimulation and responsiveness are two such practices known to foster social-emotional and cognitive development in children (Isabella, 1993; Tamis-LeMonda et al., 2001); they may also increase the child's nutritional status if mothers feed their child responsively (Pelto et al., 2003). Stimulation and responsiveness have been assessed with a standard observational interview of mothers when the child is present (Hamadani, 2001); they have also been assessed during a structured task when the mother's interaction with her child can be coded for how well it mediates cognitive development (e.g. Hubbs-Tait et al., 2002). Thus, mothers' knowledge and practices will be assessed in addition to their child's health, growth and language development. Language was chosen as the indicator of mental development as it is known to expand rapidly between 24 and 36 months and continue for the next several years.

Indicators of program quality are even more difficult to identify. Past research has indicated that education programs aimed at better health or nutrition are less successful if they rely on the one-way communication of information. Behaviour change requires role models, role playing, rehearsal, overcoming problems, and social support (Glanz, Lewis, & Reimer, 1997). Criteria for successful behaviour change programs have been outlined by Kirby (2000), particularly the use of peer educators with whom the audience identifies, and opportunities for rehearsal and problem solving. Thus, the method of delivering the messages to mothers may have a bearing on how much information the mothers retain and how well they put it into practice.

The objectives of the evaluation were: 1) to examine the impact of the parenting program on mothers' child-rearing knowledge and practices, especially practices that concern psychosocial stimulation, 2) examine the impact of the parenting program on children's language development and nutritional status, and 3) assess the quality of the program in terms of topics covered, the facilitators' knowledge, and the active and participatory nature of the sessions themselves.

## **Method**

### Study Design

The design was a cross-sectional comparison of mothers who attended parenting sessions in the previous year and their children, with matched controls from nearby villages where parenting sessions were not available. Villages where parenting sessions were conducted during the previous year were randomly selected from three rural sites. Approval of the protocol was provided by the Research Review Committee and the Ethics Review Committee of the ICDDR,B. Funding was provided by Plan Bangladesh.

### Study Population, Recruitment and Sample

Three rural sites were chosen where Plan had parenting sessions in sufficient numbers: Gazipur, Chirirbandar, and Jaldhaka. Sample sizes were estimated according to expected mean language scores of 10 out of 20 with a standard deviation of 1.5. Setting  $\alpha = .05$  and power = .90, an  $n$  of 150 for parenting and control groups provided enough power to detect a mean difference of half a standard deviation.

Mothers and children were recruited from parenting and control villages in the following manner. First, villages where parenting sessions were conducted during the previous year were randomly selected; the mothers on the list were then visited to determine if their child was between 2.5 and 4.0 years (30 – 48 months) of age. This would mean that the mother had attended the program while her child was 2 or 3 years of age. Programs for the current year, namely parenting for mothers or group care for children, had either not yet started or had been operating for at most one month. Research assistants could select at most 8 mothers and children from one parenting group. In control villages, research assistants started from three different points in the village, asking families if they had a child within the age range. If they did, they were recruited. Consent was obtained from mothers before the interview. All parenting mothers agreed to participate and approximately 95% of control mothers. The sample included 170 parenting mothers and their children and 159 controls for a total of 329.

### Measurement of Mother-reported Variables

Mothers reported on the family's sociodemographic status, their own knowledge of child development and their child's needs, and their child's health including diet and disabilities. All measures were translated into Bangla and back-translated.

1. Family sociodemographic status. Mothers reported on the household members, their age, gender, educational attainment, and occupation, and the family's religion. Economic status was assessed with questions about the ownership of 11 assets commonly included in the Bangladesh Health and Demographic Surveys (e.g. table, chair, wardrobe, bed, watch, latrine, bicycle, tube well, radio, electricity and television), ownership of a homestead and of land for production, and household income per month. The sum of all assets had an alpha of .79 and correlated highly with income, owning land for production, mother's education and father's education:  $r_s = .51, .40, .56, .51$ , respectively,  $n = 329$ ,  $ps < .0001$ . As it was less likely to have missing data, the total number of assets was used as the economic status indicator of the family. The mother's decision-making status was determined with 3 questions about whether she alone (scored 2), or jointly (scored 1) or never (0) decided what food to give the children, what medical care to seek if someone was sick, and whether to send her children to school; the composite with an alpha of .96 was the mean of the three items and could range from 0 to 2.

2. The mother's knowledge of her own child's needs and of child development generally was assessed with 17 open-ended questions scored from 0 to 3; after each response, the mother was prompted with "What else?" They were taken from topics and information found in the Parenting Manual. These asked what the child played, topics he/she liked to talk to the mother about, questions asked of the mother, common child diseases, how germs got into children, ways to soothe a crying child, and important energy and body-building foods. Questions focusing on mental development, in particular, included: What to do if the child wanted attention and the mother was busy cooking, what can parents say to help their child learn, and how play benefits their child. Any good answer was given a point. The responses were factor analyzed and alpha coefficients calculated to determine which items would fit a unitary construct of knowledge. Four items were dropped and 13 retained with an alpha of .65. Consequently the range of scores was 0 to 39.

3. The number of days the mother had attended parenting sessions was recorded, along with whether the child was currently attending child group care (Shishu Bikash Kendro) or would later. Families whose child attended the Plan parenting were asked their opinion on the program: what new they had learned, what their child had learned, whether they now did anything differently with their child, and their evaluation of the parenting experience as very good (3), good (2), more or less good (1), or not good (0).

### HOME stimulation and the Mother as an Mediator of Development

1. The Home Observation for Measurement of the Environment (HOME) Inventory is commonly used to measure the amount and quality of stimulation and support provided to a child in the family setting. The child is expected to be at home during the interview so that mother-child interaction can be observed under somewhat demanding circumstances (viz the mother is conversing with a stranger). The infant-toddler version of the inventory has 45 items which are to be scored based on observation wherever possible and otherwise on mother's answers to

questions. Several items were modified keeping in mind the intent of the item: any toy with wheels was substituted for "kiddie car, scooter, or tricycle" and clapping or singing games substituted for "learning facilitators – table, chair, high chair", looking at pictures in a book or magazine with the child substituted for "mother structures child's play periods. The questions fall into six subscales: responsiveness, acceptance of the child, organization of space and time to expose the child to stimulation, available learning materials, involvement of the mother in stimulating the child, and variety of stimulation. Each item is scored 0 or 1, and negative items such as whether the mother shouts at the child are reverse scored. Factor analyses did not yield the usual six factors of responsiveness, acceptance etc. However, 14 items from the learning materials and involvement subscales loaded on the first factor and together had an alpha coefficient of .79. They were therefore summed to create a subscale called Stimulation which was analyzed along with the total HOME score.

2. Mother-Child Interaction during Picture and Puzzle Tasks. To evaluate the mothers' role as a mediator of cognitive development of her child, we developed two tasks where the mother would interact verbally with her child (Hubbs-Tait et al., 2002; NICHD, 2001). The divergent task required the mother and child to talk as they normally would about two provided coloured pictures of scenes from rural Bangladesh. The pictures were on two sides of a laminated sheet. One was a rural village scene and the second was a series of eight paintings of men and women engaged in productive activities such as driving a rickshaw, selling at the market, and embroidering. The second task was convergent in that there was a specific goal: the mother could help her child put together a somewhat difficult 6-piece puzzle of an animal, without touching the pieces. Because children were not familiar with puzzles, the assistant stated the purpose of a puzzle, and then proceeded to demonstrate without words how one put together a 12-piece puzzle to make a picture on the box cover, starting strategically with the animal's head and showing some trial and error attempts. The assistant then gave the child the 6 pieces of another puzzle and told him/her to put them together to make another picture on the box cover. The mother was told to sit to the side and help her child if she wanted, without touching the pieces. A 6-piece puzzle was chosen so that the mother would notice cues in her child's behavior that some assistance was needed to complete the puzzle.

Each task was allotted 5 minutes, and two assistants scored each mother and child behavior according to specific pre-arranged codes. The mother codes were similar for the two tasks and were piloted to ensure completeness. The mothers' behaviors were coded to reflect the amount of simple verbal stimulation, or stimulation that engaged the child and was responsive to the child's input. It consisted of the following mother codes: Level 0: negative evaluation, off-task/disengaged; Level 1: command, point/name an object; Level 2: expand on detail beyond naming, question child, answer child; Level 3: expand on child's behavior, encourage child to talk/act or ask to expand, positive evaluation. Child codes for the picture consisted of look, point, repeat mother's words, ask or answer, name, describe detail, and off-task. Child codes for the puzzle were look vaguely, ask mother for help, follow mother's instructions, ask a question, examine pieces, trial and error, attach puzzle pieces, express positive emotion, express negative emotion, off-task. Two assistants sitting in different positions observed the interaction and ticked off the code each time the corresponding behavior occurred. If the mother talked continuously for more than 20 sec on the same code, then a second tick was recorded. If the picture interaction finished before 3 minutes, they asked the mother to continue; otherwise they allowed her to stop.

Both task interactions were coded reliably: the correlations between two assistants' codes of the picture interaction ranged from .55 to .90 with a mean of .79; the range for the puzzle interaction was .49 to .85 with a mean of .70.

### Measurement of Child Outcomes

Cognitive development was measured with the Receptive Vocabulary subtest of the WPPSI-III (2002) appropriate for children in the 2.5 to 4 year age range. Block design was intended to measure visual-spatial analytic reasoning. Unfortunately, there was little correlation between Block test scores when children took the same test on two separate days, so the measure could not be used. The problem was attributed to children's lack of experience using blocks to make patterns. Consequently, subsequent use of this measure requires giving the child a series of practice items before starting the test items. Finally, nutritional status was based on the child's weight, height, age, and gender. Greater detail follows:

1. Receptive Vocabulary. This subtest assesses children's comprehension of words. Thirty-eight words are spoken aloud and the child is required to point to one of four pictures depicting the word. Words become progressively more difficult. Thirteen words were substituted for the originals in order to maintain the expected level of difficulty within the Bangladeshi context: e.g. diagnosing was substituted for paying because cash registers and giving money to children are uncommon, drums were substituted for guitar, glittery was substituted for fancy. Answers were scored out of 0 or 1, for a maximum of 38. Scores standardized for age and ranging from 0 to 19 were used in analyses. Inter-tester reliabilities comparing scores on two different days was  $r(28) = .60, p = .0007$ , and the raw score difference between two testings 1-2 days apart was  $M = 1.29, t = 2.48, p < .02$ . Thus, children scored over one raw point higher a day later, as a result of practice and familiarity; this translates into less than one standard point. Because the items do not necessarily increase in difficulty when translated, we analyzed both the number correct using the discontinuation rule of stopping after four consecutive failures (because one correct out of four would imply random responding), and the number correct without applying the rule. The two scores were highly correlated,  $r(327) = .82, p < .0001$ , though higher by 1.20 standard points when all items were scored. Unfortunately, scores derived without applying the rule were more inversely correlated with age ( $r = -.40, p < .0001$ ), so for most analyses, we used the discontinuation rule scores. The items and standard instructions for administration and scoring were translated into Bangla and back-translated.

2. Nutritional and health status. Children were weighed on a Uniscale and heights were taken with a meter stick following the usual guidelines concerning head angle and body posture. These were converted to weight-for-age, height-for-age (stunting) and weight-for-height (wasting) z-scores using CDC 2000 guidelines. Age was determined from the immunization card if possible, from a birth registration card, or from parental report with the help of a Bangla calendar and notable events. Mothers reported on preventive health behaviours related to the child. A sum of the following 5 practices constituted the preventive practice scores: measles immunization (a good indicator of full immunization), vitamin A drops, iodized salt, safe water, and child's latrine use. A screening measure of 10 disabilities (Zaman, et al., 1990) provided scores from 0 to 10 to indicate the number of motor, sensory, speech and learning disabilities. Mothers were asked if their child had been ill in the past week (diarrhea, cough, and fever were questioned if illness was reported). Food eaten during the previous morning, afternoon and evening were recorded

followed by a probe as to whether other foods were usual though not eaten yesterday. Months of breastfeeding and age when the child first started solid food were also reported.

### Measurement of Quality of Parenting Sessions

1. Community Facilitators who gave the parenting sessions attended by these mothers were individually and privately interviewed. They were asked about their time in this position, educational attainment, total days of training, supervised days per year, refresher course days per year, who decides what they teach, their pay in the past month and what proportion came from parents and from Plan. Seven open-ended questions about parenting issues were asked: what children learn during play, advice to give mothers on playing with their child, what are the common child health problems, what to tell mothers whose children refuse food, and how to help mothers implement their advice. Each reasonably good answer was given a point for a maximum of 3. Thus, total scores could range from 0 to 21. The alpha coefficient was .73.

2. Observations were made of newly started-up parenting sessions. These were not the sessions participating mothers had attended, so their quality could not be linked to previously described mother and child outcomes. However, they were expected to provide an idea of how the sessions were implemented, how certain topics were covered, and how the mothers participated. The communicated information was not rated through observation, as this could be found in the manual. Rather, the focus on child-rearing practices and the participatory nature of the sessions were recorded. For example, beneficial behaviors required of the mother were noted, along with points for whether they were elaborated, evaluated, demonstrated and supported with materials. Potential problems in enacting the behaviors were recorded according to whether they were raised by a mother or facilitator and whether solutions were offered by either. Similarly, questions about the information or advice were recorded according to whether they were raised by a mother or facilitator and whether they were answered by either. Finally, three overall judgments were made about the session: the talk was encouraging (no, yes), the session was participatory (no, yes), and the information about causes and consequences of the required behavior was too much (60%- 100% of the session), too little (under 40%) or just right (40% - 60%).

### Procedure

Nine research assistants, with university degrees, were trained for five days to conduct the testing. The training was conducted by the principal investigator and two Bangladeshi research colleagues. The mother-child, cognitive, nutritional, and parenting session measures were practiced. At this time, inter-observer reliabilities were obtained for the cognitive tests. The assistants were also observed by trainers during their first few days of data collection and on at least one other occasion during the 6-week conduct of the study.

Data were collected during February and March. Pairs of research assistants visited families, collecting the interview and observational data and administering the cognitive test. They rated parenting sessions in the month of April. Community facilitators were interviewed in a private place. The Parenting Manual was read to determine the objectives, and the activities implemented to achieve these objectives (Plan Bangladesh, 2002). Consent was obtained from all those interviewed except children whose parents vouched for them.

### Method of Analysis

Preliminary tests were conducted to determine differences between parenting and control children on variables related to demographic and socioeconomic status. Frequencies and mean scores were therefore calculated for the two groups. Correlations of these variables with the mother and child outcomes were used to identify ones that required covariation in the final analyses. The major analyses examined differences between parenting and control groups on the HOME Inventory, mother-child interaction, mother knowledge, and child vocabulary. Gender was included to determine whether boys benefited more than girls. Analysis of covariance (ANCOVA) was used to examine group differences covarying assets, mother's education, child's age and height for age. Means rather than adjusted means are presented as the two are almost identical. Additional analyses examined whether parenting sessions benefited one SES group over the other. Secondary analyses were conducted on the parenting data alone to examine the quality of the program.

## **Results**

### Description of Sample

Table 1 provides frequency distributions for the categorized data for parenting and control children. Table 2 provides means and standard deviations for continuous variables along with t-test comparisons of the parenting and control groups.

No differences between parenting and control children were found on children's ages, mother's education, father's education, 11 assets, income, mothers' decision-making, or child disability. However, there were significant differences in the sum of five preventive health behaviors (e.g. immunization, vitamin A, iodized salt); in particular, parenting children were more likely to use a latrine than control children (30% vs 10.7%). This difference is corroborated by the percentage of families who have a latrine (47% of parenting families vs 31% of control families). Concerning nutritional status, parenting children showed greater current malnutrition compared to control children (weight for height z-score  $M_s = -1.31$  and  $-1.07$ , respectively), though the two groups had similar levels of stunting (height for age).

To identify variables that required covarying in the child outcome analyses, correlations were performed with the important mother and child outcomes (see Table 3). Receptive vocabulary scores correlated negatively with age indicating that with age children declined in relation to age norms. Stimulation provided in the home correlated positively, as expected, with mother's education, assets, and father's education. The four covariates in subsequent analyses were therefore age, assets, mother's education, and height for age. Assets correlated highly with all other SES indicators, namely income, parent education, and home and land ownership; it was therefore chosen as the indicator of SES. Mother's education and nutritional status are typically considered important protective factors for child health and survival, even though the latter was not related to any of our mother or child outcomes.



Table 1. Frequency distribution for categorized socio-demographic and health data (n = 329)

	Parenting (n=170)		Control (n=159)	
	Number	%	Number	%
Gender: boys	99	58	73	46
girls	71	42	86	54
Age: 30-35 mo.	48	28	39	25
36-41 mo.	60	35	69	43
42-48 mo.	62	37	51	32
Clinic attendance: yes	132	78	129	81
Immuniz card: yes	75	44	64	40
BCG: yes	168	99	158	99
DPT: 0	4	2	2	1
1-2	6	4	6	4
3	160	94	151	95
Polio: 0	1	<1	1	<1
1-2	3	2	3	2
3	166	98	155	98
Measles: yes	161	95	148	93
Vitamin A: yes	163	96	157	99
Iodine Knowledge	161	95	148	93
Iodized salt	149	88	130	82
Safe water	170	100	159	100
Sanitary defecation	51	30	17	11
Sick past week	60	35	53	33
Diarrhea	18	11	17	11
Cough	29	17	18	11
Fever	49	29	36	23
No Disability	145	85	136	86
Weight for age: z < -2.0	75	44	67	42
-2.0 < z < -1.0	63	37	58	37
-.99 < z < + 1.2	32	19	34	21
Height for age: z < -2.0	61	36	64	40
-2.0 < z < -1.0	65	38	61	38
-.99 < z < + 1.0	44	26	34	22

*Table 1 continued*

Weight for height: $z < -2.0$	36	21	32	20
-2.0 < $z < -1.0$	66	39	49	31
-1.0 < $z < +1.8$	68	40	78	49
Usual Food: rice	170	100	159	100
dal	92	54	92	58
protein	166	98	157	99
fruit	123	72	112	70
vegetable	169	99	155	97
milk	104	61	112	70
bread	87	51	87	55
Breastfed: 6 mo or less	4	2	6	4
7 - 24 mo	61	36	52	33
25 - 36 mo	73	43	62	39
37+ mo	32	19	39	24
Started Solids: under 5 mo	8	5	8	5
5 or 6 mo	103	60	78	49
7 - 12 mo	44	26	59	37
above 12 mo	15	9	14	9
Mother's education: none	85	50	72	45
primary school	45	27	43	27
secondary +	40	23	44	28
Father's education: none	80	48	66	42
primary school	40	24	47	30
secondary +	47	28	45	28
Live with grandparents	56	33	47	30
Religion: Muslim	144	85	136	85
Hindu	26	15	23	15
Own home	164	96	149	94
Own land for production	106	62	104	65
Fa occup: rickshaw	9	5	10	6
wage labourer	28	17	35	22
farmer	93	55	78	50
merchant	30	18	22	14
other (govt, fisher)	8	5	12	8
Latrine ownership	80	47	50	31

Table 2. Means (sd) and t-values comparing Parenting and Control on SES and health (n=329)

Variable	Parenting n= 170	Control n=159	t	p
Child's age	39.2 (5.3)	39.1 (5.3)	.25	ns
Mother's education	2.95 (3.6)	3.33 (3.7)	.96	ns
Father's education	3.26 (3.7)	3.74 (4.5)	1.12	ns
11 Assets	5.41 (2.6)	5.01 (2.7)	1.36	ns
Income	2632 (1891)	2730 (1884)	.47	ns
Decision-making (0-2)	.97 (.44)	.97 (.39)	.04	ns
Preventive health (0-5)	4.08 (.78)	3.85 (.60)	3.18	.0016
Child disability (0-10)	.21 (.57)	.16 (.42)	.77	ns
Weight/age	-1.99 (1.1)	-1.85 (1.1)	1.10	ns
Height/age	-1.69 (1.1)	-1.76 (1.0)	.62	ns
Weight/height	-1.31 (.98)	-1.07 (1.1)	2.09	.039

Table 3. Intercorrelations among indicators of SES, health, and language

	HOME Inventory	Stimula- tion	Mothers' Knowledge	Receptive Vocabulary
Gender	-.12	-.15	-.08	.01
Age	-.06	-.03	-.06	-.22**
Mother's education	.32 **	.40**	.20	.13
Father's education	.24 **	.28**	.13	.09
Assets	.29 **	.37**	.06	.08
Disability	-.04	.12	-.08	.00
Weight/age <sup>a</sup>	.10	.06	.07	.09
Height/age <sup>a</sup>	.05	.03	.09	.09
Weight/height <sup>a</sup>	.10	.09	.03	.03

a. Correlations with nutritional status were performed partialling out child's sex and parenting experience, as both variables were related to nutritional status and mother-child outcomes.

\*\* p < .0001

## Mothers' Knowledge about Child Rearing

Mothers' knowledge about mental and physical development and good child-rearing practices was significantly higher in the parenting group, with an effect size of .31 (see Table 4). Mothers of boys and girls had similar levels of knowledge. In percentage terms, the parenting mothers obtained a mean score of 70% and the control mothers 66%. Parenting mothers were particularly more knowledgeable about what their child plays (or plays with), why play is good for their child, and problems if a child starts solid food too young. They were not more knowledgeable about what to say to children to help them learn, or what to do if their child wanted attention and they were busy cooking, where only one or two good answers were given even after prompting. They were not more able to identify body building foods (proteins) or illness protection foods (fruits, vegetables), or how germs get into children (Table 5). On a separate item, mothers were asked to guess how much their child weighed; the relation between guessed and actual weight was  $r(320) = .18, p = .0009$ . Mothers' guesses were between 2 and 25 kg, whereas actual weight was between 7.9 and 15.6 kg. Mothers' judgment as to whether the child's weight was below, just right or above the proper level, showed no relation to actual z-scores ( $r_s = -.01$  weight/age,  $-.11$  height/age,  $+.09$  weight/height, *ns*). Half of the mothers thought their child was just right, and 40% guessed they were underweight. The percent distribution is accurate, if weights above  $-2.0$  z-score are considered "just right" but the judgment for individual children was unrelated to actual weight. Mothers did not seem to be aware of their own child's level of malnutrition.

## HOME Inventory

The total HOME score and the 14-item Stimulation subscale were analyzed to examine differences according to two independent variables, namely parenting exposure and child's gender, covarying assets, mother's education, child's age and height-for-age. Parenting mothers obtained significantly higher HOME scores than control mothers and the effect size was .34 or small (see Table 4). As a percentage, parenting mothers' mean score was 66.7%, though some reached as high as 98%; control mothers' mean was 62.7%. The difference was largely due to parenting mothers doing better on the Stimulation subscale. The subscale includes items about learning materials available in the home (gross motor, wheels, eye-hand coordination), as well as whether the mother taught her child something new recently (see Table 6). These topics are covered in the parenting sessions. Although superior, parenting mothers on average obtained fairly low scores for Stimulation, with a mean of 5.78 out of 14 or 41.3%, but the range was 0% to 100%. Consequently, some mothers provided a more stimulating home environment than others. This depended partly on the mother's education and family assets as well as exposure to the parenting sessions (in this order, according to a multiple regression analysis examining the relative weights of each predictor). The Responsiveness subscale of the HOME yielded similar scores for the two groups of mothers.

Stimulation was provided to boys more than girls, according to the main effects for gender on both HOME and Stimulation scores. This held for both parenting and control groups.

Table 4. Means (sd) and ANCOVA Statistics on Mother and Child (2.5 – 4.0 yrs) Indicators

Indicator	Parenting ( <i>n</i> = 170)	Control ( <i>n</i> = 159)	Total ( <i>n</i> = 329)	Source	<i>F</i>	<i>df</i>	<i>p</i>
Mother's Knowledge	27.15 (3.8)	25.83 (4.6)	26.56 (4.2)	Group	9.27	327	.0025
HOME	29.97 (5.2)	28.21 (5.0)	29.11 (5.1)	Group	9.48	327	.002
boys	30.5	28.6	29.71	Sex	6.16	327	.014
girls	29.2	27.9	28.46				
Stimulation	5.78 (3.3)	4.74 (2.8)	5.28 (3.1)	Group	9.45	327	.002
boys	6.04	5.32	5.73	Sex	11.25	327	.0009
girls	5.42	4.26	4.78	Gr x Sex	.09		ns
Responsiveness	9.24 (1.6)	8.96 (2.0)	9.10 (1.8)	Group	1.87	327	ns
boys	9.34	8.81	9.11	Sex	0.00		ns
girls	9.10	9.08	9.10	Gr x Sex	1.67		ns
Mo-Ch Picture Talk							
Level 0	2.78 (2.6)	3.31 (2.7)	3.04 (2.6)	Group	5.91	327	.02
Level 1	6.15 (4.1)	7.12 (5.9)	6.61 (5.1)	Level	11.37	3,960	.001
Level 2	17.01 (5.6)	17.92 (5.2)	17.45 (5.4)	Gr x Level			ns
Level 3	5.76 (3.6)	6.09 (3.9)	5.92 (3.8)				
Mo-Ch Puzzle Talk							
Level 0	4.26 (3.2)	5.21 (3.3)	4.72 (3.3)	Group	2.95	318	.09
Level 1	10.26 (4.4)	11.02 (4.0)	10.63 (4.2)	Level	6.21	3,954	.001
Level 2	1.42 (2.4)	.93 (1.5)	1.18 (2.1)	Gr x Level			ns
Level 3	3.80 (3.4)	3.87 (3.5)	3.83 (3.4)				
Receptive Vocabulary							
discont rule	9.01 (2.6)	9.11 (2.4)	9.06 (2.5)	Group	.15	327	ns
boys	9.21	8.77	9.02	Gr x Sex	4.05	327	.04
girls	8.72	9.41	9.10				
all items	10.28 (1.9)	10.23 (2.0)	10.26 (2.0)	Gr x Sex	4.69	327	.03
Height for age	- 1.69 (1.1)	- 1.76 (1.0)	- 1.72 (1.0)	Group	.11	327	ns
Breastfeeding months	29.26 (9.2)	28.74 (10.4)	29.01 (9.8)	Group	.38	327	ns

Note. Receptive Vocabulary scores were derived in two ways: stopping according to the discontinuation rule after 4 consecutive mistakes, and scoring all items regardless.

Table 5. Means (sd) on Test of Mother Knowledge

Measure: Item	Parenting	Control	<i>F</i> (1,328)	<i>p</i>
1. What child plays	2.78 (.48)	2.61(.71)	7.30	.007
2. Topics child talks about	2.79 (.54)	2.74 (.66)	.60	ns
3. Questions child asks	2.64 (.76)	2.48 (.94)	2.69	.10
4. What to do if ch wants attention	1.59 (.74)	1.55 (.81)	.22	ns
5. How to soothe crying child	2.17(.60)	2.14 (.72)	.15	ns
6. What to say to help child learn	1.60(.82)	1.61 (.86)	.01	ns
7. Why play is good	1.95 (.81)	1.65 (.85)	12.17	.0006
8. Problems if start solids too young	1.15 (.62)	.98 (.79)	4.70	.03
9. Problems if start solids too late	1.06(.79)	1.08 (.91)	0.00	ns
10. 3 Energy foods	2.98 (.19)	2.92(.33)	3.05	ns
* Body building foods	1.61 (.95)	1.61 (.98)	.03	ns
* Protect us illness foods	1.95 (.97)	2.11(.87)	2.67	ns
11. How germs get into children	1.76(.89)	1.63(.98)	2.16	ns
12. Child Diseases	2.58(.58)	2.52(.59)	1.39	ns
13. When to wash hands for health	2.08(.83)	1.98(.81)	1.47	ns
* What age to self feed	17.68(10.8)	17.54(9.5)	.02	ns
Composite Knowledge 13	27.15 (3.8)	25.83 (4.6)	9.27	.0025

\* items dropped from composite knowledge score

Note. *F* value derived from 2 (plan) x 2 (sex) ANCOVA on each item and Composite Knowledge.

Table 6. Number (%) of parenting and control mothers with positive answer to HOME items

Item (* included in Stimulation subscale)	Parenting (n=170)		Control (n=159)	
1. Mother spontaneously talked to child	164	(96.5)	146	(91.8)
2. Mother responds verbally to child	146	(85.9)	128	(80.5)
3. Mother names object for child	83	(48.8)	76	(47.8)
4. Mothers' speech is audible	163	(95.9)	153	(96.2)
5. Mother starts conversation with interviewer	123	(72.3)	102	(64.1)
6. Mother talks freely	159	(93.5)	151	(95.0)
7. Mother permits free play	159	(93.5)	131	(82.4)
8. Mother spontaneously praises child	139	(81.8)	133	(83.6)
9. Mother's voice is positive	156	(91.8)	147	(92.4)
10. Mother caresses child	118	(69.4)	103	(64.8)
11. Visitor's praise is approved by mother	161	(94.7)	154	(96.9)
12. Mother does not shout	152	(89.4)	143	(89.9)
13. Mother does not complain about child	164	(96.5)	151	(95.0)
14. Mother does not hit or shake child	166	(97.6)	151	(95.0)
15. Mother did not discipline child in past week	78	(45.9)	62	(39.0)
16. Mother does not threaten or criticize child	163	(95.9)	143	(89.9)
17. Mother does not interfere with child's play	158	(92.9)	144	(90.6)
18. At least 3 adults books or magazines present	46	(27.1)	31	(19.5)
19. Child has playmates	166	(97.6)	156	(98.1)
20. Less than 3 people babysit when mo absent	130	(76.5)	106	(66.7)
21. Child goes to market weekly	66	(38.8)	61	(38.4)
22. Child goes outside 4 times a week	168	(98.8)	159	(100)
23. Child goes out of village yearly	155	(91.2)	139	(87.4)
24. Child has a box for playthings *	78	(45.9)	58	(36.5)
25. Play area is safe and bright	96	(56.5)	75	(47.2)
26. Gross motor play materials *	123	(72.3)	87	(54.7)
27. Push or pull play materials *	55	(32.3)	44	(27.7)
28. Wheel toys *	64	(37.6)	49	(30.8)
29. Mother is seen to offer child a play object	32	(18.8)	38	(23.9)
30. Dramatic play materials *	105	(61.8)	86	(54.1)
31. Child plays structured social games *	165	(97.1)	153	(96.2)
32. Simple sensory-motor play materials *	66	(38.8)	40	(25.2)
33. Complex (2+ parts) sensory-motor materials *	60	(35.3)	48	(30.2)
34. At least one picture book *	32	(18.8)	22	(13.8)
35. Mother keeps child in sight during interview	158	(92.9)	150	(94.3)
36. When busy, mother talks to child	66	(38.8)	58	(36.5)
37. Taught or showed new thing past week *	70	(41.2)	52	(32.7)
38. Gave child new play material in past month *	69	(40.5)	39	(24.5)
39. Looked at pictures with child past week *	33	(19.4)	23	(14.5)
40. Mother provides slightly difficult material *	48	(28.2)	48	(30.2)
41. Father or male kin spends time daily with child	155	(91.2)	148	(93.1)
42. Told a story past week	130	(76.5)	109	(68.6)
43. Child eats supper with the family	143	(84.1)	137	(86.2)
44. Family receives guests at home monthly	149	(87.6)	146	(91.8)
45. Variety of picture books (3+)	15	(8.8)	5	(3.1)

### Mother-Child Interaction

Mothers' verbal interaction with their children during the picture and puzzles tasks was tallied and the frequencies for various codes were analyzed according to four levels. Higher levels are expected to promote greater cognitive development in the child in that they provide a supportive and challenging structure for the child's thought and speech. Asking the child to expand on what he/she previously said or did is an example of Level 3 speech, whereas simply naming an object in the picture/puzzle or commanding the child to do something is considered Level 1 (see Table 7 for levels of speech). Although many mothers would have spoken with their child about a picture, item #39 of the HOME inventory revealed that only 19% of parenting mothers and 14% of controls had done so in the past week. Similarly, item #33 which asks if there are any complex eye-hand coordination materials, defined here as consisting of at least two pieces (such as a puzzle, but not a rattle), showed that 35% of parenting mothers and 30% of controls had such an object.

Repeated measures analyses of covariance were used to compare levels between Parenting and Control families with boys and girls. Parenting and control mothers used the same levels of speech to talk with their children (see Table 4). With the picture task, Level 2 speech was the most common, accounting for over half the mothers' talk. Thus, mothers talked about details in the picture beyond simply naming objects, they asked questions ("What is this?") and answered the child's questions. Mothers used more Level 2 talk toward girls than boys. However, mothers did not tailor their talk to the age or vocabulary of the child as one might expect; there were no significant correlations between speech utterances of the four levels and the child's vocabulary score or age. However, there was a certain synchrony between mother and child. Mothers who used lots of Level 2 talk (asking and answering) elicited mostly short answers and word repetition, but not much elaborated or self-initiated talk from their children. On the puzzle task, all mothers were most likely to use Level 1 speech, commanding their child to attach pieces in a certain way or naming parts of the puzzle picture. Level 1 and Level 3 talk (praise and building on the child's previous action) both resulted in the child following the mother's instructions. Again, children seem to follow their mothers' lead in these tasks, answering her questions, repeating the words she uses, and following her instructions on how to complete the puzzle. There was evidence, therefore, that children were responsive to their mothers' demands, but mothers were not responsive to their children's abilities, and not providing a structure within which the child could initiate and expand language and problem solving.

### Children's Receptive Vocabulary

Receptive vocabulary was scored using all items and applying the discontinuation rule of stopping after 4 continuous failures. The results were similar except that children's scores were obviously higher by 1.20 standard points when all items were scored. There were no differences between children whose mothers had gone to parenting sessions and controls (see Table 4). However, there was a significant parenting by gender interaction indicating that boys did better in the parenting group whereas girls did better in the control group. There is no obvious explanation for this gender difference, except that it matches the amount of HOME stimulation given to boys compared to girls. It will be important to remedy this in the future.



Table 7. Mean frequencies of mother and child speech during the Picture and Puzzle interactions

Level	Speech Form	Parenting	Control	Overall	Range
<u>Mother Picture talk</u>					
Level 0	Negative	1.0	0.9	1.0	0 - 8
	Off-task	1.7	2.4	2.0	0 - 13
1	Command	2.1	2.4	2.2	0 - 15
	Point/name	4.1	4.8	4.4	0 - 15
2	Expand on details	4.9	4.6	4.8	0 - 15
	Question child	11.1	12.2	11.2	0 - 15
3	Answer child	1.0	1.1	1.1	0 - 15
	Expand on ch talk	0.5	0.6	0.5	0 - 8
	Ask ch to expand	3.7	4.2	4.0	0 - 13
	Positive feedback	1.6	1.3	1.4	0 - 11
<u>Mother Puzzle talk</u>					
Level 0	Negative	2.2	2.5	2.3	0 - 12
	Off-task	2.0	2.8	2.4	0 - 15
1	Command	9.1	10.1	9.5	0 - 15
	Point/name	1.2	.9	1.1	0 - 13
2	Expand on details	.3	.2	.3	0 - 10
	Question child	.6	.3	.4	0 - 12
3	Answer child	.5	.5	.5	0 - 9
	Expand on ch actions	.1	.0	.1	0 - 4
	Ask ch to expand	2.2	2.5	2.4	0 - 14
	Positive feedback	1.6	1.3	1.4	0 - 7
<u>Child Picture interaction</u>					
	Off-task	2.9	3.4	3.1	0 - 15
	Points	1.8	2.1	1.9	0 - 15
	Repeats mother's word	3.5	3.2	3.3	0 - 15
	Answers mother	9.3	10.0	9.7	0 - 15
	Spontaneously names object	2.0	1.4	1.7	0 - 13
	Asks question	2.0	1.9	1.9	0 - 15
	Talks beyond naming	1.5	1.3	1.4	0 - 14
<u>Child Puzzle interaction</u>					
	Off-task	2.4	3.2	2.8	0 - 12
	Asks for help	.8	.7	.8	0 - 10
	Follows mother's instruction	5.0	5.3	5.1	0 - 15
	Asks mother question	1.6	1.4	1.5	0 - 15
	Examines pieces	1.7	1.5	1.6	0 - 7
	Trial and error	5.3	5.6	5.4	0 - 15
	Attaches pieces	1.4	1.0	1.2	0 - 8

### Nutritional and Physical Health Status of Child

A large portion of both parenting and control children were underweight and stunted (approximately 40%, see Table 1). They were similarly stunted, but parenting children showed more wasting in terms of weight-for-height, after controlling for differences in assets, mother's education and child's age. Girls in the parenting group suffered more from low weight for their age (underweight) compared to boys ( $M_s = -2.30$  and  $-1.76$ ), whereas control girls and boys were roughly equivalent at  $M = -1.85$ . Both groups started eating solid foods at around 8 months of age, and the duration of breastfeeding was similar ( $M = 29$  months). Unlike the preschool children, three-year-olds' vocabulary was not yet correlated with weight or height. Stunting but not wasting was correlated with the family assets and mother's education ( $r_s = -.23$  and  $-.18$ ,  $p < .001$ , respectively). Children ate more diverse food on the previous day, especially fruit and milk and less rice and vegetables (often potatoes), if the family had more assets ( $r = .14$  to  $.24$ ,  $p < .01$ ), and the mother's education was higher ( $r_s = .15$  to  $.23$ ,  $p < .01$ ).

As mentioned previously, most of the children took part in preventive health procedures, such as immunization, vitamin A drops, iodized salt and safe water; however, most did not use a latrine. Plan recently undertook a sanitation campaign to raise awareness and build latrines and this showed in higher levels of latrine use among 3-year-olds in the parenting group compared to controls (30% vs 11%, respectively). Overall one-third of the children were reported to be sick during the previous week. The expected 15% of children were reported by mothers to have one of the ten disabilities, most frequently a delay in acquiring motor milestones such as walking or running (see Table 8). This is not particularly serious if unaccompanied by other sensory or mental disabilities.

Table 8. Number and percent of children with disabilities

Disability	Parenting (n=170)		Control (n=159)	
	No.	%	No.	%
1. Delay in motor milestones	13	7.7	11	6.9
2. Difficulty seeing	0	0.0	0	0.0
3. Hearing difficulty	4	2.4	3	1.9
4. Comprehending instructions	0	0.0	0	0.0
5. Weakness in limbs	4	2.4	1	.6
6. Epilepsy	3	1.8	4	2.5
7. Difficulty learning	4	2.4	0	0.0
8. Speech	1	.6	1	.6
9. Articulation	5	2.9	3	1.9
10. Mentally delayed	2	1.2	4	2.5
Total with 1 or more disabilities	25	15.0	23	14.4

### Parenting Sessions

On average mothers attended 17 parenting sessions, with a range of 0 to 52. That is, some mothers signed up but did not attend any session and others attended many. Some 46% attended 0 to 9 sessions, 34% attended 10 to 30 sessions, and 20% attended more than 31. Attending more sessions did not seem to raise the mother's knowledge score or her evaluation of the program. Some 22% evaluated the program as very good, 73% as good, and 5 % as more or less good; none stated that it was not good. When asked what they had learned from the sessions, mothers identified on average two things they had learned, and 57% could name two or three things that they now did differently. Some 58% were going to send their child to Plan's 3- and 4-year-old Shishu Bikash Kendro preschools for the current year and the remainder expected to do so the following year. This demonstrates a continuing interest in the early childhood program.

Facilitators of the parenting sessions lived in the villages where they gave weekly sessions during the previous year to mothers in our sample. Twenty-three community facilitators and five supervisors were interviewed. Community facilitators and supervisors differed on only a few variables, namely their years of education and current pay, as well as one knowledge item, namely advice to a mother on how to play with her child (see Table 9). Out of a total possible score of 21 (7 items scored 0 – 3), facilitators obtained 11 and supervisors 13.6; these were not significantly different because there was a great deal of overlap. These scores were similar to mothers' knowledge scores. The facilitators generally had 17 days of basic training and 4 days a month of supervision, and monthly refresher courses. Their manual included 40 topics ranging from pregnancy and delivery to nutrition, diseases, learning materials, discipline and child rights. Facilitators stated that the most difficult advice for mothers was how to engage her child while doing housework. Facilitators and supervisors were short on solutions to this problem, other than to repeat with encouragement that mothers must talk to their child. This advice will not work for children who are mobile and who need learning materials in addition to talk.

Table 9. Parenting Facilitator ( $n=23$ ) and Supervisor ( $n=5$ ) Means (sd) and t-test comparison

	Facilitator	Supervisor	$t$ (26)	Overall $M$	Range
Knowledge (0-21)	10.9 (3.3)	13.6 (3.2)	1.66 ns	11.4	6-18
Benefits of free play	2.8 (.7)	3.0 (.7)	ns	2.8	2-3
Health problems	1.7 (1.0)	2.4 (.9)	ns	1.8	0-3
Advice if ch refuses food	1.7 (.7)	2.0 (.7)	ns	1.6	1-3
Advice on how to play	1.4 (.9)	2.4 (.5)	2.30*	1.6	0-3
Advice if ch not walk/talk	1.7 (.9)	2.2 (.8)	ns	1.8	1-3
Which lessons most difficult	1.1 (.5)	1.4 (1.1)	ns	1.2	0-3
How to implement knowledge	1.5 (.8)	1.2 (.4)	ns	0.3	0-1
Months on Job	10.7 ( 7.6)	17.4 (18.1)	ns	11.9	1-48
Years education	8.7 (1.2)	14.4 (.9 )	9.80**	9.75	0-16
Pay	349 (170)	3120 (563)	20.77**	844	60-3600
Parent contribution	107.3 (138.8)	0	3.63**	67 (21)	0-425
Plan contribution	276.2 (169)	1023(1383)	8.58**	1332 (1478)	0-5001

\*  $p < .05$ ; \*\*  $p < .001$

Ten parenting sessions were observed during the month of April, so groups had time to form and stabilize. On average 17 mothers attended the group session, with a range of 9 to 25, many of whom had babies with them. On average slightly over five specific maternal behaviors were touched on, most of them positive behaviors which mothers were advised to perform (rather than negative behaviors to avoid), 86% of them were elaborated but only 20% demonstrated and 6% supported with material props (see Table 10).

Mothers usually need help overcoming obstacles to performing the behaviors, so we tallied the number of problems raised by the instructor and the mothers and how many solutions were offered by each. More problems were raised by the instructor than the mothers. On average 3 to 4 solutions were offered for the instructor-initiated problems, and most of these solutions came from the instructor. Mothers themselves raised on average only one problem throughout the session and once again more solutions came from the instructor. Problems, then, appear to be raised by instructors and solved by them as part of their lesson plan, though the ranges of solutions indicate that some were better at this than others. Mothers probably need to be encouraged to consider problems to their enacting the advice and then brainstorm how to solve these problems. This is one way to help them translate knowledge into practices.

The number of questions posed by instructors also exceeded those of mothers. When instructors raised questions, they were answered mainly by mothers and some by instructors; and when mothers raised questions they were answered by the instructor. It may be that mothers expect instructors to be the "expert" and to answer their questions. However, answers and solutions need to be found amongst themselves. If the parenting sessions are presented as simply information-giving sessions, then mothers understandably look to the facilitator as an instructor with the information. However, if the sessions are presented as behavior change sessions, then the responsibility is placed on mothers to try the new practice, inform the group about problems she encountered, and together generate many solutions from which the mother can choose which suits her family situation.

Overall evaluations given to the session by the observers were very positive: 90% were considered to be participatory, in 100% the facilitator was encouraging, and in 100% the right amount of time was spent giving information (between 40-60%). Facilitators stated, however, that they needed additional materials, such as pictures, materials to make toys, a story book, a doll on which to demonstrate behaviors, health materials, and rhyme and song books. They seem to have a point. Demonstrations of behaviors need to be performed by the facilitator using props such as a doll and a toy, and then practiced by the mothers, many of whom attend with babies.

Table 10. Descriptive features observed during 10 Parenting sessions

Variable	Means (sd)		Range
<u>Who attended</u>			
Mothers present	16.6	(5.5)	9 – 25
Babies present	10.1	(4.5)	4 – 17
Fathers present	.10	(.32)	0 – 1
<u>Specific behaviors mentioned</u>			
	5.20	(1.4)	3 – 7
% elaborated on	86		
% evaluated as good	86		
% demonstrated	20		
% supported with materials	6		
<u>Problems to enacting advice:</u>			
Raised by Instructor	4.00	(1.3)	3 – 7
Solutions per problem	3.64	(.96)	1.67 – 5.00
Solutions offered by Instru	9.80	(5.1)	2 – 18
" offered by Mothers	4.70	(4.2)	0 – 14
Raised by Mothers	1.10	(1.3)	0 – 4
Solutions per problem	1.50	(1.5)	0 – 4
Solutions offered by Instru	2.67	(1.4)	1 – 5
" offered by Mothers	1.17	(0.4)	1 – 2
<u>Questions about information/advice:</u>			
Raised by Instructor	5.20	(2.3)	1 - 8
Answers per question	4.17	(1.6)	2 – 7
Answered by Instru	8.40	(7.3)	1 – 20
" by Mothers	12.60	(8.0)	2 – 25
Raised by Mothers	2.10	(2.0)	0 - 7
Answers per question	5.37	(4.3)	0 - 13
Answered by Instru	3.87	(3.9)	1 – 13
" by Mothers	.25	(.46)	0 – 1

## Discussion

The objectives of the evaluation were twofold: 1) to examine the effects of the parenting intervention on mother and child outcomes, and 2) to assess the method of implementation of parenting activities along with the relevance and appropriateness of materials and training of field-level implementers.

### Mother and Child Outcomes

The parenting sessions were successful in raising the overall level of knowledge of mothers about child rearing. In particular, parenting mothers knew more benefits of play and what problems were associated with starting solid foods too soon. The other knowledge items were not answered better by parenting mothers.

Mothers who attended parenting sessions for one year had higher HOME Inventory scores, particularly on items concerning stimulation of their 3-year-old. Overall, they scored in the 66.7% range (30 out of 45) which is higher than control mothers and higher than that found in other studies in Bangladesh. Most of this difference is due to parenting mothers having higher scores for stimulation; the child had learning materials, and the mothers had given something new in the past month. Consequently, the mothers understood and acted on parenting messages about the need to provide stimulation for mental development. The most likely stimulation was gross motor play, dramatic play, and structured social games. However, too few children had materials that required eye-hand coordination or combining two or more objects. Picture books were scarce as were mother-child interactions that involved talking about pictures. Picture talk is important as it allows the child to develop vocabulary and communication about life beyond the family household. Out of 14 stimulation items, parenting mothers averaged under 6. Boys received more stimulation than girls. All mothers fared better on items relating to responsiveness to the child during the conduct of the interview: they responded to their child's questions, talked spontaneously, and praised their child. These are positive outcomes that show love and attention. Also, the wide range of scores indicated that many mothers provided very stimulating and responsive environments for their child and others did not. The strengths of individual mothers could be identified and shared during parenting sessions, so that mothers learn from each other how best to practice stimulating and responsive interactions. They might each be encouraged to demonstrate something special they do with their child.

The maternal benefits did not reach their children in any way that we observed, with one exception. Children of parenting mothers were three times more likely to use a latrine, partly because more of them owned a latrine but also because they used it (only one-third of control families who owned a latrine required their children to use it). The nutritional status of parenting children was no better than that of controls in that 20% were wasted and 36% stunted. They both started solid foods a few months too late, ate the same relatively undiversified diet, and continued breastfeeding for 2 ½ years. Likewise over one-third had been sick the previous week. The children had similar scores on a measure of receptive vocabulary. There was variability in child outcomes, with some children in the +1.00 range in height-for-age and some children scoring a very high 16 out of 19 in receptive vocabulary. Educated mothers were more likely to

develop these strengths in their children, reinforcing once again, the long-term value of getting girls educated.

Reasons why the knowledge and stimulation benefits did not trickle down to the children require some analysis. Providing mothers with knowledge alone was not sufficient to change their child-feeding practices though it did change the learning materials they provided. These may have been too few and too simple on their own to keep children interested and challenged. For example, only one-third had a toy that required putting two or more pieces together, and although close to 20% had a picture book, less than 10% had three such books. Many children had dramatic play materials and gross motor toys, but few had spent time talking with their mother about pictures in the past week and few had received help with something difficult. Our observation of the mother's communication with her child on two such tasks showed that her instruction was not always responsive to the child's age-related abilities or needs. To develop child language and problem-solving skills, mothers need to show more responsive communication as in Level 3 talk. Level 3 includes expanding on what the child says and does, and encouraging the child to take the next step. The children were very compliant, but they were complying with simple demands such as the mother's request that they name objects in the picture or put two pieces of the puzzle together. Mothers did not use more challenging talk with older than younger children and they did not demand more talk from children with larger vocabularies. They did not ask open-ended questions that encouraged rather than constrained the child's language and thought.

#### Implementation of Parenting Program

Our observations of ongoing parenting sessions and interviews with parenting facilitators identified a number of strengths of the program. Mothers evaluated the program positively and could identify ways that the program had changed them and their practices. A strong infrastructure was in place to identify and train many village women each year as facilitators to implement the sessions. Extensive training is required to cover all 40 topics in the parenting manual. The topics were well-chosen and the information in the manual was largely accurate, detailed, and sufficiently colloquial to be understood by most rural, illiterate mothers. Facilitators held their sessions in the afternoons when and wherever it was convenient for mothers to attend; they were observed to be encouraging and friendly in their approach and to allow for participation by the audience. Giving information accounted for part of the session and discussing questions and problems accounted for another sizeable part. These qualities contributed to the continued success of the program. Most mothers intended to send their child to preschool class this year or next.

Not all mothers took advantage of the 40 or more sessions held each year. Almost half had attended less than 10 sessions, although some had attended more than 40; the average was 17. Mothers who attended more sessions were not more knowledgeable or favourable to the program. Facilitators obtained a 66% average on their knowledge test – fairly similar to the mothers' score on their test. Possibly there are too many topics and too much information for both facilitators and mothers to remember. Most experts now agree that the amount of information should be kept to the essentials (UNICEF Facts for Life), with supporting information offered as secondary to the advice on essential practices. Highlighting one or two essential practices each session would make it easier for mothers to focus on a practice and easier

to recall. A simple visual memory clue, or emblem for the week, would help both facilitators and mothers remember the theme and the recommended practice. Additionally, 40 topics may be more than mothers need or want; the fact that almost half attended less than 10 sessions without any difference in their knowledge score implies that more is not necessarily better. Perhaps there are certain topics that are more interesting to mothers and draw a larger audience. These should be emphasized and expanded, rather than adding more topics. A division of labour among facilitators might be helpful: Village mothers might be credible facilitators when discussing the topic of pregnancy and delivery to a select group of pregnant women; whereas adolescents who are older sisters might have credibility telling mothers how to play with and talk to children.

Finally, the sessions themselves provide clues as to why mothers' practices and children's outcomes did not change. Although five specific practices might have been mentioned, only one out of five was demonstrated and very rarely with material props. Babies were always present at these sessions and could have been used to demonstrate a point such as where signs of health or disease show up and how to encourage play and conversation. Facilitators all mentioned materials they needed in addition to the manual and ball (the manual rarely noted necessary materials other than a ball). These included pictures, posters, materials to make toys, story books, rhyme and song books, and a doll. As part of their training, facilitators should learn stories, rhymes and songs to teach the mothers. Some of these might convey to mothers a message about caring practices, and others might be used to stimulate children. Pictures are a necessity because most people do not attend to or retain auditory information without visuals to accompany them. Finally, facilitators should demonstrate the practice they advocate and mothers should rehearse it during the session. Their homework assignment should be to try the practice at home during the week and come to the next session prepared to demonstrate how they did it and offer their opinion on its merits and problems. Problem solving with the help of other mothers should be an important part of the sessions. Currently, most questions and problems were raised by the facilitator; the mothers themselves asked two questions and raised one problem to implementing the practice. Fortunately many answers and solutions were offered, as this provided the mothers with flexible options for coping with the new practice. However, it is also helpful if mothers describe how they personally tried to implement the practice, the problems they encountered and how they solved the problems. Other mothers should offer their solutions, so that there develops a sense of non-expert partnership in solving problems. In other words, the sessions should become more practice based, problem solving, and socially supportive.

In conclusion, the parenting program has many successes to be proud of: it creates a body of expertise among community women on child health and development; it attracts a large number of mothers from the villages; the mothers achieve higher levels of knowledge than control mothers; and the mothers provide more stimulation for their children. However, the limitations are that children do not show benefits in terms of their health, nutritional status, or language development. This may be due to limitations in the curriculum, which focuses more on increasing mothers' knowledge than on improving her practices. Strategies for behavior change, such as demonstrations, role plays, and rehearsing the practice with one's child, as well as attention to the mothers' specific problems in implementing advice, need to be part of the curriculum.



## **Recommendations**

1. **Package the Parenting Manual into four main topics:** Health and Nutrition, Child Stimulation, Pregnancy and Delivery, and other Child-Rearing topics. Offer the first two at times of the year when most mothers can come; offer the third as a separate package given by a model mother to pregnant women and their husbands; offer the fourth during the off-season when only some mothers can attend.

2. **Make the important messages more memorable:**

- a. Prioritize the messages within each session, to highlight 1 or 2 important practices and 4 supporting items of information e.g. 2 ways to get food into children who refuse and the 4 most important reasons why children do not eat (Session 16).
- b. Provide memory tricks to help mothers and facilitators recall the message.
- c. Provide visual cues such as demonstrations with props, and salient emblems of the message.

3. **Correct sections of the Manual that are misleading:**

- a. Mothers do not need to care for themselves during pregnancy or their post-partum period by stopping their usual work; with more food and rest, they should be able to continue their usual activities up to the seventh month, and shortly after delivering. Offering incorrect advice, which incidentally cannot possibly be followed, jeopardizes credibility of the program.
- b. The description of malnutrition emphasizes marasmus and kwashiorkor, which are not relevant to the state of chronic malnutrition experienced by almost 50% of the children. From this lesson (Session 11), most mothers conclude that their child is not malnourished – a false conclusion. Nutrition and stimulation are the two most important determinants of child development, so the nutrition sessions (11 to 15) should be modified.
- c. Children should not eat sugar, and mothers should not use cotton-tipped sticks in ears.

4. **The three key elements of a successful program are practice, problem-solving, and peer support.** The learning goal of each session should be to acquire a new practice. This should be stated up-front in the lesson. The practice should be demonstrated with props by the facilitator or by another mother who has her baby. Mothers should try out the new practice with their friend or child during the session, or during the week at home. There should be a lengthy discussion of the problems encountered and how to solve them, asking more successful mothers how they overcame such problems.

5. **Provide facilitators during training with the materials they need for session demonstrations.**

Let them draw their own pictures, and make their own doll for role plays. They should learn to make more complex and sustainable learning materials, so they can have a workshop session with mothers. All mothers should make and practice scaffolding their child's play with: a rattle (under 1 year), a cloth doll (all ages), a set of 10 small bamboo blocks of different sizes (over 1 year), newspaper or magazine pictures (over 1 year). Teach facilitators songs and rhymes to teach mothers: some rhymes help people remember messages, songs are to sing to children. Add to the manual an annex of games and materials for children of different ages. Use the HOME Inventory to identify what mothers need to provide stimulation.

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