

**DETERMINANTS OF POSITIVE AND NEGATIVE DEVIANCE
IN CHILD NUTRITION**

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Funded by USAID under Contract No. 388-0027-C-00-9026-00

August 1993

The authors accept full responsibility for the views expressed in this report as well as for any errors or omissions. The contents do not necessarily reflect the position of USAID or the Ministry of Food, Government of Bangladesh.

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Summary

Children are the most vulnerable among malnourished population of Bangladesh. Interventions concentrated on increasing household income or targeted food interventions alone have failed to address malnourished children at least in the short run. This positive and negative deviance study attempts to identify adaptive and avoidable childcare practices that may help in designing policies and programs to improve nutritional status of children.

In the present study, children possessing remarkably good health compared to the others in the same environmental setting are identified as positive deviants. Those, who are doing worst are categorized as negative deviants. Children falling in between positive and negative deviance are labeled as median growers.

The analysis indicates that determinants of child nutrition are not exactly the same for different groups of children. Determinants of negative deviance are: child's calorie intake; child's age; gender of the child; low-birth-weight; early weaning; occurrence of diarrhea; continuation of breastfeeding until the breasts are emptied; mother's weight; primary caretaker's frequent illness; primary caretaker's exposure to sources of knowledge on nutrition and child care; empowerment of primary caretaker; and primary caretaker's satisfaction with her family life.

Determinants of positive deviance are: child's calorie intake; child's age; gender of the child; early weaning; occurrence of diarrhea; mother's weight; primary caretaker's ability to understand child's physical and emotional needs and respond to them appropriately; and primary caretaker's exposure to sources of knowledge related to nutrition and child care.

Introduction

It is widely acknowledged that socio-economic development will not bring forth an immediate change in poverty situation in developing countries such as Bangladesh. Malnutrition is one of the issues closely related to poverty. The extent of malnutrition in Bangladesh has been exceedingly alarming for a long time. Children have been identified to be the most vulnerable among malnourished population of the country. Around 47.3% of children aged 6 to 72 months are suffering from second degree malnourishment and 6.8% are categorized in the third degree of malnutrition.¹

Household level interventions have concentrated primarily on raising household income. This approach has so far been proved not to be an effective tool in improving child nutrition. This is mainly due to the following reasons: firstly, although income elasticity of food expenditure (0.78) is quite high in poor households, income elasticity of calorie intake is only about 0.28; Secondly, Intra-household food distribution is highly unfavorable for young children. Preschooler's elasticity of calorie intake in respect to per capita household calorie intake is 0.45.²

¹ Bangladesh Bureau of Statistics (BBS). 1991. Report of the child nutritional status survey 1989-90; Dhaka: Ministry of Planning.

² Ahmed, A. 1993. "Food consumption and nutritional effects of targeted food interventions in Bangladesh." Draft Report. Dhaka: IFPRI.

This induces one to explore alternative or additional to income ways to improve child nutrition. Household food security, care of children and women and access to health services, together with a healthy environment are the three essential determinants of good nutrition (See App. Figure 1). Food oriented or health oriented policies for improving nutrition are not sufficient for reducing malnutrition significantly. Similarly, it is quite absurd to think that care of children and women alone will abolish malnutrition. All these conditions are interrelated and no rigid demarkation line can be drawn between them. Care depends, to some extent, on both food availability in the household and access of the household to health services. So, different approaches should be tried for improving nutritional status of children.

Positive and negative deviance study is an attempt to broaden the affordable methods to reduce needless death and retardation of young children.³ Such studies help to identify adaptive and avoidable child care practices and their underlying factors. Formulation and implementation of policies based on such studies can be effective in improving nutritional status of children.

The term "positive deviance" in nutrition was introduced to reflect adequate child growth in adverse environmental settings, where a majority of children suffer from growth retardation and malnutrition. In this study, positive deviance, negative deviance and median growth are defined in the context of observed

³ Zeitlin, M., H. Ghassemi, M. Mansour. 1990. *Positive deviance in child nutrition*. Tokyo: The United Nations University.

growth patterns in poor environments and thus obviate the need for reference to "adequate" or "inadequate" growth.⁴

In our study, we deal with : 1) families that are doing better in nourishing their children than others; 2) families with poor performance in nourishing their children; 3) families representing children of median growth.

The objectives of the study are:

- 1) To identify adaptive child-care practices that promote positive deviant children.
- 2) To identify practices that adversely affect child's health and that are avoidable.
- 3) To formulate policy recommendations to improve nutritional status of children.

⁴ Shekar. M., J-P. Habicht, M.C. Latham. 1991. Is positive deviance in growth simply the converse of negative deviance? Food and Nutrition Bulletin, No. 13, No. 1.

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Source and Nature of Data

In this study, the analysis of positive and negative deviance in child nutrition is based on cross section data collected in the household nutrition survey (second round), and a supplementary field survey on positive and negative deviance conducted by IFPRI in Bangladesh. The second round of household nutrition survey was carried out in 1992. This survey covered 741 households comprising 4402 individuals in 9 villages, two in each of the 4 divisions of Bangladesh. The nutrition survey data was used to select the sample for the present study. Most of the socio-economic and demographic information used in the analysis also came from this data set (Table 1). The supplementary field survey was designed to collect data on different practices of child rearing in different rural households and to provide insight on factors that influence those practices. This survey was conducted in 1993. Supplementary data collection included 110 households with 111 children as the sample.

Method

In-depth, open-ended interviews of the child's caretakers together with direct observation of the environment and of caring behaviors were used in positive and negative deviance survey.

Supplementary data was collected on child feeding and dietary practices; health and hygiene; caretaker's characteristics, exposure, knowledge, attitudes, and

Table 1-Source of data

Household Nutrition Survey	Positive and Negative Deviance Survey
-Socio-economic status	-Social support system
-Demographic characteristics	-Maternal-paternal networking
-Anthropometry	-Caretaker's characteristics, exposure, status, knowledge and attitude
-Supplementary food	-Breastfeeding and dietary practices
-Curative health care practices	-Hygiene and sanitation
	-Caretaker-child interaction

practices; maternal and paternal networking; caretaker-child interaction; and social support system. At first a subsample of children aged 6 to 18 months was chosen from nutrition survey data. This age group was selected as the focus was on, nutritionally most vulnerable children. General findings show a sharp decline in nutritional status of children at this particular age range.

The objective of our study was to see why some of the children are nutritionally better-off or worse-off than the rest although they belong to more or less same environmental setting. So, we did not find it necessary to compare health status of these children to some external growth standards. We tried to define positive deviants, median growers and negative deviants in context of observed growth patterns in the sample. Moreover, the analysis was focused on determinants of positive and negative deviance that are not influenced by income. So, the following model was used for identification of positive deviants, negative deviants and median growers.

$$Y = \alpha + \beta_1 X + \beta_2 Z + \mu \quad (1)$$

Where; Y = child's actual weight;
 α = constant;
 X = child's age
 Z = per capita household expenditure
 (proxy for income)
 μ = Error term;
 β_1, β_2 = coefficients.

Estimating the equation (1) we got the \hat{Y} and defined the positive deviants, median growers and negative deviants by applying the following conditions:

If, $Y_i > \hat{Y}_i + \text{SER}$, the child was categorized as positive deviant.

If, $Y_i < \hat{Y}_i - \text{SER}$ the child was categorized as negative deviant.

If, $\hat{Y}_i - \text{SER} \leq Y_i \leq \hat{Y}_i + \text{SER}$ the child was categorized as median grower.

Where: Y_i = weight of the i-th child

\hat{Y}_i = fitted weight of the i-th child

SER = Standard error of regression.

Thus, in the present study, positive deviants are children, whose actual weight is greater than the fitted value for the particular child plus the standard error of regression. Negative deviants are those, whose actual weight is less than the fitted weight minus the standard error of regression. The rest was identified as median growers.

Among 111 children aged 6 to 18 months, 15 (13.51% of total sample) were positive deviants, 17 (15.32% of total sample) were negative and the rest 71.17% were median growers.

Descriptive analysis

By definition, child care is "the provision in the household and community of time, attention, and support to meet physical, mental, and social needs of the growing child".⁵ Components of child care are feeding practices, affection and attention, health practices, and cognitive development.

In this section, findings related to different child care practices will be presented at first. Then we shall go beyond these practices to identify some factors that influence the ways and quality of child rearing in different groups of children.

I. CHILD CARE PRACTICES

Feeding practices

It is generally believed that colostrum is usually not given to children in rural Bangladesh. Quite contrary to this belief, we found that 84.7% of the children in the survey received colostrum. More of the positive deviant children (93.3%) received colostrum compared to median growers (84.8%) and negative deviants (76.5%) (Table 2). Although overall percentage of children receiving colostrum is quite high (54.9%), not many children received colostrum the day they were born. About 73% of positive deviant children received colostrum on the first day of their lives, compared to 50.6% of median growers and 58.8% of

⁵ Zeitlin, M.F. 1992 (?) Child care and nutrition: The findings from positive deviance research. Medford, MA: Tufts University School of Nutrition.

negative deviants. The difference in colostrum receipt on first day of life between positive deviance and median growers is statistically significant.

Lapse in time between the birth of child and the first breastfeeding on average was longest among negative deviants (35 hours), and shortest among positive deviants (22 hours).

Prolonged exclusive breastfeeding⁶ is the general practice in rural Bangladesh. Only in extreme situations (e.g. serious illness/death of mother, or lack of breast milk) might induce introduction of weaning food at an early age. These situations were more common especially in families with negative deviants, and to some extent, in families with median growers. It was found that 64.7% of negative deviants and 32.9% of median growers were weaned before they were 4 months old. Among positive deviant children, 13.3% were weaned at such an early age. Here, the difference between positive and negative deviance is statistically highly significant. The difference between negative deviants and median growers is also statistically highly significant.

A common practice among mothers in rural Bangladesh is to interrupt breastfeeding sessions (82%) for various reasons. Percentage of mothers doing so was less in the upper end and more in the lower end of the growth spectrum. Reverse was the picture in emptying breasts in each breastfeeding session. No one in negative deviance group practiced it. In contrast, 33.3% of mothers in positive deviance continued breastfeeding until the breasts were emptied. The differences between positive and negative deviance, and between negative

⁶ Exclusive breastfeeding excludes feeding water.

Table 2- Breastfeeding and weaning practices

Practices	Positive deviance	Median growth	Negative deviance	Level of significance ¹	Level of significance ²	Level of Significance ³	All
Colostrum given, %	93.3	84.8	76.5	n.s.	n.s.	n.s.	84.7
Colostrum given on the first day, %	73.3	50.6	58.8	n.s.	.1048*	n.s.	46.8
Gap between birth and breast feeding started, hour	21.93	32.08	34.91	n.s.	n.s.	n.s.	31.1
Mother interrupts breastfeeding session, %	73.3	82.3	88.2	n.s.	n.s.	n.s.	82.0
Breastfeeding continues until breasts are emptied, %	33.3	16.5	0	.0095***	n.s.	.072*	16.2
Weaned before the child was 4 months old, %	13.3	32.9	64.7	.0031***	n.s.	.0145***	33.3

Source: International Food Policy Research Institute. "Positive and Negative Deviance Survey, 1992"

¹ Comparison between positive deviance and negative deviance

² Comparison between positive deviance and median growth

³ Comparison between negative deviance and median growth.

*** Significant at the 0.01 level.

** Significant at the 0.05 level.

* Significant at the 0.10 level.

deviance and median growth are statistically significant. About 17% mothers among median growers emptied their breasts in every breastfeeding session.

The period during which mothers followed restricted diet after delivery was most prolonged (about 81 days) in negative deviance (see App. Table 5). The period was shortest in positive deviance (about 9 days). The mothers of median growers followed restricted diet upto 29 days after giving birth. The difference between negative deviance and median growth in following restricted diet after delivery is statistically significant.

The number of food items eaten in the family, but not given to children was highest in negative deviance and lowest among median growers. The difference between the two groups is statistically significant.

No families with negative deviant children specially prepared or processed food for their children. About 27% of families with positive deviant children and 23% of families with median growers specially prepared food for their children. The difference between positive and negative deviance, and between negative deviance and median growth are statistically significant.

Table 3 shows that considerably more of the positive deviant children were given vegetables, foods from animal origin, pulses, fruits and sweets compared to children in other groups. The difference in percentages of children given vegetables, food from animal origin and pulses are statistically highly significant between positive and negative deviance. The lowest proportion of children given vegetables belonged to negative deviance (37.5%). The differences between positive deviants and negative deviants and between negative deviants and median growers are statistically significant. In positive

Table 3-Information on supplementary food, %

Food items and nutrients	Positive deviance	Median growth	Negative deviance	Level of significance ¹	Level of significance ²	Level of Significance ³	All
Consumption of food by food groups, %							
Vegetable	86.7	73.4	37.5	.0049***	n.s.	0.005***	70.4
Pulses	60.0	49.4	43.8	n.s.	n.s.	n.s.	50.0
Food from animal sources	86.7	60.8	43.8	.0125***	.0539	n.s.	62.0
Fruits	60.0	55.7	56.3	n.s.	n.s.	n.s.	56.3
Sweets	66.7	60.8	56.3	n.s.	n.s.	n.s.	61.1
Nutrient intake (cap/day)							
Calorie intake, k.cal.	387.62	289.15	199.36	n.s.	n.s.	n.s.	288.71
Protein intake, gr.	9.89	7.12	5.11	n.s.	n.s.	n.s.	7.18
Iron intake, mgr	5.27	4.05	2.2	.046**	n.s.	n.s.	3.93
Vitamin-A intake, micro g.	511.09	447.37	235.25	n.s.	n.s.	n.s.	423.91
Calorie adequacy, %	37.87	35.52	25.71	n.s.	n.s.	n.s.	-

Source: International Food Policy Research Institute. "Consumption and Nutrition Survey, 1992".

¹ Comparison between positive deviance and negative deviance

² Comparison between positive deviance and median growth

³ Comparison between negative deviance and median growth.

*** Significant at the 0.01 level.

** Significant at the 0.05 level.

* Significant at the 0.10 level.

deviance 86.7% were given food from animal sources, while that of the negative deviant children was 43.8%. This difference is statistically significant.

Nutrient intakes of positive deviant children far exceeded, the intakes of other two groups of children. The intakes of positive deviant children were almost twice as much as that of the negative deviant children. The difference between the two groups in iron intake is statistically significant. The above results clearly show that the quality of food given to the positive deviant children is undoubtedly better.

Hygiene behavior and health care practices

Diarrhea is very much related to various sanitation and hygiene practices. Marked drop in diarrhea accompanying the Bangladesh phase II hygiene intervention⁷ indicates a strong relationship between the two. Thus, occurrence of diarrhea can be treated as an indicator of hygiene and sanitation conditions. Results show (see App. Table 4) that 58.8% of negative deviants had suffered from diarrhea within two weeks before the interview. Much less of the positive deviant children (26.7%) had diarrhea during that period. The difference is statistically significant between positive deviance and negative deviance.

⁷ Zeitlin, M.F., 1992 (?) Child care and nutrition: The findings from positive deviance research Medford, MA: Tufts University School of Nutrition.

All the positive deviant families drink tubewell water. Among negative deviant families 94.1% drink tubewell water and the rest drink water from well. Storage of water was hygienic for 85.7% of positive deviance families, while the percentage is 73.3% in negative deviance families.

Comparison of positive deviance and negative deviance indicates more families with positive deviant children: disposed garbage in a proper way; cleared off human and animal feces immediately; did not let the children eat unhygienic things. Most of them did not bottle-feed their children.

Comparatively more families in positive deviance than negative deviance washed raw fruits and vegetables before eating (40% against 5.9%). More of positive deviants were trained in toilet hygiene. Results indicate that the training of children was undoubtedly better in families with positive deviant children. More positive deviants (40%) were trained to wash their hands before eating compared to negative deviants (35.3%).

Information on curative health care practices in the sample shows that 60% of positive deviants were treated by certified doctors, while 33.3% of negative deviants were taken to them for treatment. All positive deviant children were treated, whenever they fell ill. In contrast, Not all the sick children among negative deviants and median growers were taken for treatment.

Caretaker-child interaction

Close and affectionate interactions between the caretaker and the child may promote growth of the child both through maternal responsiveness to the child's needs and by direct physiological effect on the child (e.g., stimulation of

growth, immune function, exploratory behavior, etc.).⁸ In different positive deviance studies affection and attentiveness were found to be strongly linked to growth of children.

Findings of this study are consistent with other findings in indicating the importance of care in improving child nutrition (Table 4). The overall percentage of primary caretakers, who were able to understand the physical and emotional needs of the child and tried to meet them is only about 22%. About 53% of caretakers in positive deviance were in this group, compared with 6% in negative deviance and 19% in families with median growers. The differences between positive deviance and the two other groups are statistically highly significant.

Majority of caretakers in positive deviance (93.3%) encouraged or stimulated the child to do the right things and to do it properly. In contrast, only 19% of median growers and 5.9% of negative deviants were encouraged by their caretakers. The differences between positive deviants and two other groups of children are statistically significant.

Comparatively more of the caretakers (80%) of positive deviants were found to tell stories to the children. Statistically significant difference is found between percentages of caretakers telling children stories and singing them songs in positive deviance and median growth.

⁸ Zeitlin, M.F., H. Ghassemi, M. Monsour. 1990. Positive deviance in child nutrition. Tokyo: The United Nation's University.

Table 4-Primary caretaker-child interaction, %

Practices	Positive deviance	Median grower	Negative deviance	Level of significance ¹	Level of significance ²	Level of Significance ³	All
Mostly able to understand and respond to the physical and emotional needs of the child	53.3	19.0	5.9	.0028***	.0045***	n.s.	21.6
Encourages the child to do the right things and to do it properly	93.3	69.6	52.9	.0112***	.0567*	n.s.	70.3
Most of the time the child is left unattended	0	16.5	5.9	n.s.	.0905*	n.s.	12.6
Tells stories, sings songs	80.0	54.4	58.8	n.s.	.0653*	n.s.	58.6

Source: International Food Policy Research Institute. "Positive and Negative Deviance Survey, 1993".

¹ Comparison between positive deviance and negative deviance

² Comparison between positive deviance and median growth

³ Comparison between negative deviance and median growth.

*** Significant at the 0.01 level.

** Significant at the 0.05 level.

* Significant at the 0.10 level.

II. FACTORS FACILITATING EXISTING CHILD CARE PRACTICES

Social Support

Pleasant atmosphere in the family, intimate support within the home and from neighbors, friends and relatives appear to facilitate child care. Some information on the social support system, and parental networking is presented in Appendix Table 2 .

No parents of positive deviant children and median growers were divorcees. In contrast, 5.9% of mothers in negative deviance were divorcees. More than one fourth the of parents in positive deviance cared a lot for each other. The mothers were never abused in these families. The percentage of parents having such good relation was very low in negative deviance. The findings suggest that 5.9% of parents in negative deviance were on extremely bad terms with each other. No parents in positive deviance had such a bad relation with each other. Quite alarmingly, more than a fifth of the negative deviant children were reported to be unwanted children.

One-third of primary caretakers in positive deviance were quite satisfied with their family lives, compared with those in negative deviance (5.9%). The difference between the two groups is statistically significant.

Families with positive deviant children had more support from outside the family. Many of these families (86.7%) were usually helped by neighbors and relatives when food or clothes were scarce or when the child needed to be attended.

Mother's/Primary caretaker's exposure to outer world

Exposure to outer world, to sources of information on health and nutrition and child care is mostly associated with improved child care techniques.

In our study, we found that 80% of primary caretakers in positive deviance listened to radio programs related to nutrition and child care (Table 5). Only about 24% of primary caretakers in negative deviance were doing so. More of mothers in positive deviance worked outside home, compared to mothers in negative deviance. Visits to health care center was less frequent among primary caretakers of positive deviants than that of the negative deviants. More frequent visits to medical centers by primary caretakers of negative deviants were due to frequent illness of the children. Number of times primary caretakers of positive deviants visited friends and relatives outside village last year was twice that of the negative deviants.

In general, the level of education of parents in our sample was quite low. Years of schooling of primary caretaker was more in negative deviance than that of the positive deviance. This indicates that formal education, at least at the given level, does not seem to facilitate better child care.

Mother's /primary caretaker's physical and psychological state

Both physical health and psychological state of mother strongly influence the child rearing techniques and the quality of childcare.

Table 5-Caretaker's exposure to outer world

Practices	Positive deviance	Median growth	Negative deviance	Level of significance ¹	Level of significance ²	Level of Significance ³	All
Listens to radio programs related to nutrition and child care, %	80.0	51.9	23.5	.0014***	.0442**	.0334**	51.4
Mother never attended school, %	80	87.7	64.7	n.s.	n.s.	.0199**	83.8
Father never attended school, %	66.7	64.2	47.1	n.s.	n.s.	n.s.	62.2
Working mother, %	20.0	15.2	17.6	n.s.	n.s.	n.s.	16.2
Visited the health care centre last year, times	2.14	2.81	4.29	n.s.	n.s.	n.s.	2.95
No. of visits to friends and relatives outside the village last year	5.87	4.46	2.71	n.s.	n.s.	n.s.	4.38
Year of schooling of the primary caretaker	0.67	0.39	2.29	n.s.	n.s.	.000***	0.72

Source: International Food Policy Research Institute. "Consumption and Nutrition Survey, 1992" and "Positive and Negative Deviance Survey, 1993.

¹ Comparison between positive deviance and negative deviance

² Comparison between positive deviance and median growth

³ Comparison between negative deviance and median growth.

*** Significant at the 0.01 level.

** Significant at the 0.05 level.

* Significant at the 0.10 level.

Mothers of positive deviant children were healthier than the mothers of other two groups of children (see App. Table 3). Number of pregnancies of mother in positive deviance was the lowest. Birth spacing was the longest among the positive deviance families. Among mothers of positive deviants 60% had adopted family planning, while the adoption rate was much lower in the other two groups. More of primary caretakers in negative deviance were overworked. Primary caretakers suffered from illness frequently in negative deviance families compared to positive deviance families. No primary caretaker in positive deviance was characterized by hopeless or helpless attitude. On the contrary, 60% of them were found to be enterprising and about 47% appeared to be intelligent. All these factors contributed to better health of the positive deviant children.

Regression analysis

Caring behavior is one of the most important factors determining child's nutritional status. In this study, various caring practices are used as explanatory variables in regression analysis to identify the determinants of nutritional status of different groups of children. The results of the regression analysis are presented in this section.

The dependent variable in the first regression equation (1) is the actual weight of child in kilograms. The sample population in (1) covered all children. The first set of explanatory variables is demographic, which include a dummy for child's sex (1 for male), child's age in year and birth order. A strong relationship has been observed in previous studies between age, gender, birth order and child's health status. The HKI Bangladesh reports gender differentials in Bangladesh (HKI 1993). IFPRI's recent work has shown that child's birth order has a negative impact on child nutrition (Ahmed 1993).

A dummy for low-birth-weight children is used in the regression as one of the explanatory variables. Calorie intake of child is another important variable in the regression. Two other child-specific variables in the regression are dummy for children weaned before they were four months old; and dummy for children suffering from diarrhea within two weeks before the interview.

The second set of variables are related to the child's mother and child's primary caretaker. Mother's weight is one of the important variables in this group.

In many studies, including IFPRI's, mother's health status was found to be strongly associated with child's nutritional status (Ahmed 1993; Chavez et al. 1974; Graves 1976).

Findings from different studies indicate that mother's role in resource allocation is positively related to child's well-being (Garcia 1991; Guyer 1980; Haddad and Hoddinot 1991; Haddad, Hoddinot and pena 1992; Thomas 1992; von Broun and Kennedy 1992). It is most often translated into a better health for the child. So, a dummy variable for the primary caretaker's status in the family, defined by her role in decision making process in the family was incorporated in the regression.

It was hypothesized that the main caretaker's attributes and characteristics would influence child's health outcomes. So, a few of such variables are incorporated in the regression. The variables are dummies for primary caretakers often ill; realizing, attentive caretakers; primary caretakers listening to radio programs related to nutrition and child care; and primary caretakers satisfied with their family lives.

It is important to know whether a variable operates uniformly as one moves from positive to median to negative deviance.⁹ For this purpose we have run regressions separately. Positive deviants and median growers (P-M) (2) were included in one equation, and median growers and negative deviants (M-N) (3), in the other. Results of these regressions differed from the results obtained from the first regression equation, where the all the children where included.

⁹ Shekar. M., J-P. Habicht, M.C. Latham. 1991. Is positive deviance in growth simply the converse of negative deviance? Food and Nutrition Bulletin, No.13, No.1.

Table 6 shows the regression results, which include estimated coefficients and t-statistics and indicate whether a variable is significant at the 1% or 5% or 10% levels. Most of the coefficients has the expected signs, and many of them are significant. Some of the variables are statistically significant in one of the regressions and not significant in the other. It shows that different factors are in operation in different segments of the growth spectrum. Different sets of factors determine the nutritional status of different groups of children.

Calorie intake is positively and significantly related to child's weight in all the regressions. It shows that increase in calorie intake would help a negative deviant move towards the group of median growers. Similarly, it would help a median grower to move upward in the growth spectrum.

Child's age is found to be positively related to weight and the association is highly significant.

Much is said about gender discrimination in Bangladesh and other countries similar to it. In the present study gender is found be one of the significant determinants of health status at the age range of 6 to 18 months. Results show that male children are healthier than girls in all the groups. However, this does not yet signify gender discrimination. Further analysis is needed to conclude that.

Weaning at too early an age has a strong negative impact on child's health. The negative relationship is highly significant in all the regressions. The coefficients are comparatively large. Episode of diarrhea is another factor having

Table 6-Determinants of child's nutritional status

Explanatory variables	All children		Positive deviance		Negative deviance	
	Estimated Parameters	t-Value	Estimated Parameters	t-Values	Estimated Parameters	t-Values
Constant	3.506	2.68***	3.822	3.13***	3.890	3.70***
Calorie intake	0.0008	2.86***	0.0006	2.10**	0.0004	1.72*
Child's age	1.951	3.02***	2.384	3.91***	1.889	3.57***
Sex (dummy)	0.378	1.93*	0.362	1.78*	0.349	2.17**
Birth Order	-0.030	-0.86	-0.038	-1.06	0.004	0.16
Low-birth weight child (dummy)	-0.620	-1.88*	-	-	-0.445	-1.75*
Breast feeding is continued until breasts are emptied	0.221	0.94	0.210	0.93	0.343	-1.7*
Weaning starting age is less than four months (dummy)	-0.679	-3.35***	-0.402	-1.83*	-0.525	-3.21***
Suffered from diarrhea within last two weeks (dummy)	-0.478	-2.34**	-0.432	-2.13**	-0.443	-2.64***
Mother's weight	0.042	1.86*	0.028	1.27	0.044	2.43**
Primary caretaker often sick (dummy)	-	-	-	-	-0.472	-1.83*
Primary caretaker able to understand and respond to the physical and emotional needs of the child (dummy)	0.510	2.06**	0.436	1.78*	-	-
Primary caretaker listens to radio program related to nutrition and child care (dummy)	0.619	3.15***	0.392	2.00**	0.303	1.83*
Primary caretaker's role is negligible in decision making process in the family (dummy)	-0.386	-1.57	-0.293	-1.78	-0.466	-2.27**
Primary caretaker satisfied with her family life (dummy)	0.528	2.08**	0.305	1.22	0.631	2.95***
F-statistic		7.2***		4.853***		6.118***
\bar{R}^2		0.43		0.36		0.43

Note: Dependent variable is child's weight in kg.

- *** Significant at the 0.01 level.
- ** Significant at the 0.05 level.
- * Significant at the 0.10 level.

a negative impact on child's health. This relationship is statistically significant in all the equations. It implies that these factors would hinder a child's upward movement along the growth spectrum.

Primary caretaker's exposure to nutrition and child care related information is positively related to child's health. In the regressions, listening to radio programs related to nutrition and child care is found to facilitate child's health. The positive relationship is highly significant both for positive and negative deviance. The coefficient of this variable is different for the two groups. Evidently, it is due to the fact that comparatively more of the primary caretakers of P-M group are intelligent and enterprising, able to absorb new information and to act according to the advises received from such programs.

Good health of mother has a positive impact on child's health, especially, by enhancing her ability to provide care. The relationship is statistically significant. Besides the fact that a healthier mother has better chances to produce a healthier child, being physically strong, she is also able to provide more care for the child. Good health of a mother is also an indicator of better health practices in the family. Mother's weight has proved to be positively and significantly related to child's weight in negative deviance. It indicates an improvement in mother's health in this group of children would bring forth an improvement in child's health.

Satisfaction of primary caretaker in her family life is another important factor influencing child nutrition. Primary caretaker's satisfaction in her family life significantly contributes to health outcomes of negative deviant children. The same is not valid for median growers.

Primary caretaker's role in decision making process is not statistically significant in the first regression, where all the children are included in the sample, disregarding the groups they belong to. The third regression (M-N) results indicate that the primary caretaker's role in decision making is an important factor in improving the health of negative deviants. In other words, empowerment of primary caretakers will facilitate nutrition of negative deviant children.

The positive association of continuation of breastfeeding until the breasts are emptied to the child's weight is insignificant in the first two regressions, whereas it is significant in the third one. It implies that the child's health outcomes will be better if mothers of negative deviants continue breastfeeding session until the breasts are completely emptied.

As it is seen from the results of third regression, negligible role of primary caretaker in family's resource allocation and in choosing child rearing options can adversely affect the child's health.

Three additional variables incorporated in the model for M-N are discussed below: 1) We observed, many of our negative deviants were low-birth-weight children. 2) Primary caretakers of these children happened to be sick very often. We hypothesized that these variables are very much related to child's health outcomes in negative deviance. So, they were incorporated in the third regression. The dummy for low-birth-weight children is statistically significant with a negative sign, showing it's negative impact on child's health, even after a lapse in time.

Results show that frequent illness of primary caretaker adversely affect child's health in negative deviance by limiting her ability to take care of the child.

Primary caretaker's ability to understand physical and emotional needs of the child and to respond to them contribute positively to the child's health outcomes. The quality of child care is obviously better in families where primary caretaker of the child is wise, attentive and caring. This relationship is also statistically significant in the first two regressions.

6

Case Study

In this section, we have added a few case studies. Real people behind the figures and snapshots of their lives are presented in these case studies.

Case Study 1

In Comilla, Nira (one of the investigators) and I (Ruchira) visited a rich family with a severely malnourished child, called Saddam. He is 28 months old. He looks much smaller for his age. He is very weak. His legs are excessively thin. He has a big head and a big tummy. He has just begun to walk, but he is not yet steady on his legs. His skull has not yet hardened. He has not yet learned to speak. His eight months old brother also looks much like him.

When we entered the house Saddam was sitting on the ground wearing a soiled shirt holding a stick. The house was dirty and untidy with uncleanly, stinking beds. It was apparent from Saddam's looks that he is not bathed regularly.

In contrast with most children, Saddam did not show any interest in strangers. The child was not mobile. Though he could crawl well, he preferred not to move around. Once or twice he cried to climb on his mother's lap.

Saddam's mother, Kohinoor is a very beautiful young woman, but with a strange distant, forlorn look in her eyes. She is rather lethargic. She looked very

tired and anaemic. Her appearance instantly gave the impression of something being seriously wrong with her. Like her son, she was quite indifferent to our presence in the house.

Kohinoor virtually had no time for Saddam. She had to pay more attention to the younger child. In fact, she did not have much time for the younger one either. She just breastfed the child once during our stay in the house and went about her household chores, leaving her children unattended.

Kohinoor was very busy with post harvest operations of crops. Peanut plants were brought in from the field on the previous day. When we came to the house, peanut plants were being dried in the yard. The weather was unpredictable. It showered twice during our stay in the house. Consequently, Kohinoor had to run about to bring in the peanut plants and to lay them out again when the rain was over. She had to clean the plants, and separate the nuts from the plants.

Though the family is relatively rich, nobody was hired to help Kohinoor. When I asked why nobody was hired to assist her, Kohinoor just smiled resignedly. Hearing my question, her two sister-in-laws stared at me and then laughed out loud, as if the question of hiring someone to assist is absurd.

We watched Kohinoor serve breakfast, wash dishes, cook for family members and guests. Whenever she sat down for a moment to catch up her breath, she was sharply rebuked by her mother-in-law. While she was busy the younger child cried until he was completely worn out and fell asleep. Clearly, Kohinoor was overworked. She just did not have time and energy to provide proper care to her children.

Saddam sat down for breakfast with his father, Abdui Mannan in the morning. Mannan told us that Saddam has a good appetite and usually eats a lot. It seemed to us that intestinal worm made the child eat so much. Saddam and his father ate rice with prawn and vegetable curry. Then, they had rice with milk and banana.

Kohinoor, however, had rice only with mashed coriander. When asked, she told that she was on a special diet as her breastfed child was ill. she added that most of the time at least one of her children was ill. So, she had been on such a restricted diet ever since she became a mother. By asking her questions, we found out that she herself does not believe in benefits of such diet. On the contrary, she feels that the diet restriction is quite harmful for her as well as for her children's health. Yet, she cannot go against the social norms and beliefs.

When Saddam finished his breakfast he began to eat peanuts. He ate the muddy peanuts with his dirty hands. Nobody bothered to wash the peanuts for him or stopping him from eating them. His mouth was smeared with mud. He looked quite a sight, but nobody paid any attention to him.

After a while Mannan took Saddam to a nearby house to have a chat with his neighbors. He sat in the yard talking to other men. Saddam was sitting on his father's lap. Eventually, he was lulled to sleep. His father sat there for some time. Then he brought the child home. He laid him down on the dirty bed putting an even dirtier pillow beneath his head. Saddam slept uneasily moaning from time to time. He was still asleep when we left the house three hours later.

From the open-ended interviews and discussions with the parents and some other relatives we gathered that Saddam is one of the twins. Both of them

were low-birth-weight children. Mother's breastmilk was insufficient for the two of them. So, from the fifth day Saddam was bottle-fed sweet water, powdered rice and powdered milk. When Saddam was nine-month old, his twin brother died. Two months after, Kohinoor conceived again. So, by the 19th month Saddam had to be completely weaned in spite of his poor health.

Saddam is almost always suffering from some diseases. It is not difficult to figure out by his appearance how ill he is. He weighed only 7 kg. In spite of his illness, the child was never taken to the hospital. Only village quacks, fakirs and kabirajs treated him.

Conservativeness of the family is responsible for the lack of proper treatment of the child. Saddam's father, grandfather and uncles do not believe in most of the things that are modern and scientific. They do not let the women adopt family planning. They even consider listening to radio to be sinful. Only on rare occasions they allow the women to go out, only to visit their relatives. Women are never allowed to go to public places.

So, even if Saddam's father could overcome the family's and his own reservations against modern health care system, he will not take his child to a hospital because the mother is not allowed to go along to take care of the child. Thus, it was much convenient for Mannan to call in fakirs and kabirajs than to take Saddam to a doctor.

Case Study 2

In Chilmari, we visited a well-off family with a negative deviant girl child Shathi, who was the only child born to her parents after seven years of their marriage. Shahana, Shathi's mother, told us that Shathi was a long cherished baby. It was quite puzzling to us why she would be a negative deviant. Observation and interview revealed that lack of knowledge of prenatal care of mother, child care techniques and hygiene is responsible for the child's poor health.

Shathi is a low-birth-weight child. We found out that her mother fasted during the month of Ramadan while she was carrying Shathi. Shahana was completely unaware of the consequences. Moreover, she suffered from acute blood dysentery during the last three months of her pregnancy. She was very sick indeed. Everybody in the neighborhood thought neither the child, nor the mother would survive. Luckily, they both survived, but Shathi had a real bad start. She was a sickly newborn. She is still underweight. She is 22 months old and weighs only 7.5 kg. Shahana complained that Shathi is usually sick most of the time. During her sickness she had no appetite. At the time of our visit, however Shathi was not sick.

Everybody in the household loves the child very much. Shathi is usually taken to doctors when she is ill. The family members do not seem to understand that the highly unhygienic environment of the house, and lack of knowledge about proper child care make Shathi suffer from frequent episodes of diarrhea and cold.

Like most of the rich farmers, this family lives in a well-built tin-roofed house, with a big yard with it. The house is poorly kept. The bed room is very dirty and untidy with unclean beds. Though adult family members wore clean clothes, they seemed not to be conscious at all of the uncleanliness of their house and their children. The house was not cleaned once during our stay. Dishes, plates and glasses used in family are dirty as well. The pitcher, used for storing drinking water was not covered.

Most of the time during our observation, Shathi was wandering in the yard. She was frequently sucking her dirty fingers. Time to time she picked up filth from the ground and put it into her mouth. We even saw her chew a crawling insect! Nobody seemed to be concerned about what she was doing in the yard.

It was lean season. Breakfast was over. Shahana was having her leisure. She did not pay much attention to the child.

That morning Shathi's grandmother fed her some rice with a curry of fish and potato. At noon her mother fed her rice with some fried leafy vegetables. In between she had green mango. She was nursed by her mother twice during the 4-hour observation period.

We noticed that Shahana did not wash her hands before feeding Shathi her rice meal. Several times during the meal, Shathi ate using her dirty hands. Nobody stopped her from doing that.

Salam, Shathi's father is very fond of his daughter. He played with the child, caressed her and bounced her to make her laugh. Time to time Shathi came to her mother and climbed on her lap.

Nira told me this was something quite new to her. On two previous visits, she had never seen such close, intimate interactions between the child and her parents. During those visits, the parents were very busy with agricultural activities and household work. Shahana had to cook all day for the whole family and the hired labor. The number of hired labor was usually around 10 to 12 during peak season and the family itself consists of 11 members. She was overburdened with work. At those times the child rarely saw her parents.

Case Study 3

Bappi is one of our positive deviant children living in Kurigram. He is very restless, and a bit unruly. His family is not poor. The house is very neat and clean. The parents and the child were clean dressed. Bappi's mother Shiuly is intelligent. She is very attentive, full of love and care for the child. The parents has praiseworthy patience for the naughty, overactive child. We observed that they tried never to leave him unattended.

We were quite surprised to see that the child ate an omelette from a plate with a spoon. Cookies are his regular snacks. A number of times he had cookies. During our observation he ate some fried wheat grains as well. The father, Abu Bakar told us that he often gives him vitamin-C tablets. Bappi does not have the habit of putting dirty things in his mouth as most children do.

Unlike most of the mothers in rural areas, Shiuly did not follow restricted diet after delivery. Shiuly told us that she never stopped breastfeeding the child, as others sometimes do when children have diarrhea. No food eaten in family is withheld from the child.

Shiuly always tries to keep the house clean. We found out that she uses soda for washing bed covers, quilts and other clothes.

Once during the observation, Shiuly caught Bappi digging the ground with a hoe taken from a neighboring household. She took away the hoe immediately, returned it to her neighbors and asked them to keep such dangerous things out of the reach of young children.

Bappi is the only child of his parents and they take much care of the child. When Shiuly is busy in the kitchen, Abu Bakar looks after the boy. The child has a good time with his father. We saw him play with his father's umbrella, torch, and watch. Abu Bakar actively participated in the games his son proposed. While playing he was telling the child what he should and should not do. He showed Bappi pictures from a book and Bappi urged him to read him from the book as Abu Bakar usually does.

Shiuly told us that TDH (Terre Des Hommes) is the source of her knowledge on child-care and hygiene. She often visits "Mother and Child Care Center" of TDH. She had some training on basics of child care and nutrition in the center. Though the parents have only one child, they have already adopted family planning. The parents seemed to be quite happy with their family life.

Case Study 4

Another of our positive deviant child from Kurigram belongs to a poor rickshaw puller's family. The child's name is Raju. Their house is strikingly neat and clean. There are two rooms in the house. One is used by Raju's parents as a bedroom. The other one serves multi-purpose. It is used as the kitchen, and it is also the grandmother's bedroom. Goats are kept in the same room at night. The room looked so nice that we could hardly believe that merely an hour ago breakfast was being prepared there. There was no trace or smell of goats living there at night.

Raju is a nice, intelligent child. He is one of those children who can easily elicit affection.

Raju is fed frequently. He was breastfed three times during our stay in the house. He had three meals. The first two meals he had at this own house. Those were rice meals with a curry of amaranths leaves. He had his third meal in one of his grandfathers' house, a cousin of Raju's own grandfather, who died long ago. Everybody in grandfather's family loves Raju. The grandfather is quite well-off. He gives good food and toys to Raju. Raju is very much attached to his grandfather's family. The grandfather and grandmother gladly fulfill Raju's demands. They enjoyed feeding the child various foods and buying him clothes and toys.

The day we visited the family, Raju had his lunch in his grandfather's house. He was served rice with beef curry, vegetable curry and lentil soup. Raju seemed to relish the food.

Raju's mother, Aziza is lively, intelligent and full of energy. His own grandmother, Jhol is calm and quiet, caring, and hard working with a strong sense of responsibility for the family. Raju's father is the only son she has. She struggled a lot to brought up her son. She cares for her young daughter-in-law and loves her grandson very much. Whenever food is not enough in the family she finds herself some kind of work and has her meals outside. She does not want to make the family share the scanty food with her. She often brings in cash, or food to help the family.

Jhol is a very active woman. She was either gathering firewood or taking care of her goats, or cleaning the house and bathing Raju or doing some other household work. She considered her daughter-in-law to be too young and tried to protect her against any kind of hardship. She made such sacrifices so that the mother had enough time and energy for her child. The village people praised the grandmother a lot.

Though very young, Aziza is quite intelligent. Raju is her only child, but she has already adopted family planning. She thinks that they are too poor to have another child. So, she has decided to take preventive measures. Nobody in the family opposed her.

Preventive health care practices in the family is quite modern. Raju rarely got sick, but whenever sick, he is taken immediately to "Mother and child care center" of TDH (Terre Des Hommes). These visits provide good exposure, and knowledge on nutrition and child care for both the mother and the grandmother.

Conclusion

An understanding of factors influencing nutritional status is essential for formulation, implementation and evaluation of policies to alleviate malnutrition. This study expands on and complements previous analyses done in this area. The strength of this study lies in combining both qualitative and quantitative methods of analysis. Analysis has shown that determinants of positive and negative deviance are not necessarily the same. Even if some of the determinants are common in both the groups, magnitude of their impact may be different in different groups. A clear understanding of this is important for targeting, policy design and evaluation of intervention.

Determinants of negative deviance are:

- Child's calorie intake
- Child's age
- Child's gender
- Low-birth-weight
- Early weaning
- Occurrence of diarrhea
- Continuation of breast feeding until breasts are emptied
- Mother's weight
- Primary caretaker's frequent illness
- Primary caretaker's exposure to radio programs related to nutrition and child care.
- Primary caretaker's empowerment

- Primary caretaker's satisfaction with her family life.

Determinants of positive deviance are:

- Child's calorie intake
- Child's age
- Child's gender
- Early weaning
- Occurrence of diarrhea
- Mother's weight
- Primary caretaker's ability to understand child's physical and emotional needs and respond to them appropriately.
- Primary caretaker's exposure to radio programs related to nutrition and child care.

Interventions targeted at negative deviance should address the following issues:

- Proper prenatal care;
- Proper breastfeeding practices;
- Well-timed introduction of weaning food;
- Reduction of diarrheal disease;
- Empowerment of primary caretaker;
- Improvement of maternal wealth;
- Exposure of Primary caretaker to sources of knowledge on nutrition and child care.

Interventions targeted at median growers should address the following issues:

- Proper amount of supplementary feeding;
- Reduction of diarrheal disease;
- Introduction of weaning food at an appropriate age;

- Exposure of primary caretaker to sources of knowledge related to nutrition and child care;
- Enhancement of primary caretaker's ability to understand child's physical and emotional needs and respond to it appropriately.

Appendix Table 1-Characteristics of respondent household

Practices	Positive deviance	Median growth	Negative deviance	All
Per capita monthly income,tk	310.55	260.09	411.15	290.04
Household size, no.	6.6	6.29	7.12	6.46
Male	3.87	3.15	3.59	3.32
Male children under 5 years	1.07	0.95	0.94	0.96
Female	2.73	3.14	3.53	3.14
Female children under 5 years	0.47	0.76	1.0	0.76
Weight-for-age (average z-score)	-1.03	-2.42	-3.77	-2.44
Height-for-weight (average z-score)	-1.8	-2.68	-3.78	-2.73
Weight-for-height (average z-score)	0.2	-0.71	-1.44	-0.7
Low-birth-weight children, %	0	8.9	23.5	9.9
Years of schooling, mother	0.8	0.39	2.29	0.74
Years of schooling, father	2.2	1.46	3.59	1.88

Source: International Food Policy Research Institute. "Consumption and Nutrition Survey, 1992" and "Positive and Negative Deviance Study, 1993".

¹ Comparison between positive deviance and negative deviance

² Comparison between positive deviance and median growth

³ Comparison between negative deviance and median growth.

*** Significant at the 0.01 level.

** Significant at the 0.05 level.

* Significant at the 0.10 level.

Appendix Table 2-Information on support environment. %

	Positive deviance	Median grower	Negative deviance	Level of significance ¹	Level of significance ²	Level of significance ³	All
Parents live together	93.3	92.4	82.4	n.s.	n.s.	n.s.	91.0
Parents divorced	0	0	5.9	n.s.	n.s.	.0302**	0.9
Father has more than one living wife	0	5.1	0	n.s.	n.s.	n.s.	3.6
Parents care for each other	26.7	15.2	5.9	n.s.	n.s.	n.s.	15.3
Parents on extremely bad terms	0	1.3	5.9	n.s.	n.s.	n.s.	1.8
HH head loves the child	100	100*	94.1	n.s.	n.s.	.0302**	99.1
Unwanted child	6.7	16.5	23.5	n.s.	n.s.	n.s.	16.2
Number of caretakers	1.53	1.56	1.65	n.s.	n.s.	n.s.	1.56
Primary caretaker satisfied with her family life	33.3	20.3	5.9	.0471**	n.s.	n.s.	19.8
Primary caretaker has no role in decision making process in the family	13.3	26.6	23.5	n.s.	n.s.	n.s.	24.3
Family helped by relatives and neighbors in need	86.7	74.7	76.5	n.s.	n.s.	n.s.	76.6

Source: International Food Policy Research Institute. "Positive and Negative Deviance Survey, 1993."

¹ Comparison between positive deviance and negative deviance

² Comparison between positive deviance and median growth

³ Comparison between negative deviance and median growth.

*** Significant at the 0.01 level.

** Significant at the 0.05 level.

* Significant at the 0.10 level.

Appendix Table 3-Mother's/primary caretaker's personal history and characteristics

	Positive deviance	Median grower	Negative deviance	Level of significance ¹	Level of significance ²	Level of Significance ³	All
Number of pregnancies of the mother	2.93	4.24	3.88	n.s.	0.61 [*]	n.s.	4.0
Number of children died	0.8	0.96	1.0	n.s.	n.s.	n.s.	0.95
Months between birth of present child and the next pregnancy	24.71	19.52	16.83	.04 ^{**}	.078 [*]	n.s.	20.03
Mother adopts family planning, %	60.0	48.1	35.3	n.s.	n.s.	n.s.	47.7
Mother's weight, kg	41.75	40.53	39.03	.067 [*]	n.s.	n.s.	40.45
Number of children the primary caretaker has to look after	2.4	2.35	2.53	n.s.	n.s.	n.s.	2.39
Overworked primary caretaker, %	13.3	16.5	41.2	.0804 [*]	n.s.	.0228 ^{**}	19.8
Primary caretaker often sick, %	13.3	8.9	17.6	n.s.	n.s.	n.s.	10.8
Enterprising primary caretaker	60.0	27.8	11.8	.0041 ^{***}	.0151 ^{**}	n.s.	29.7
Hopeless primary caretaker	0	13.9	35.3	.0106 ^{***}	n.s.	.0362 ^{**}	15.3
Intelligent primary caretaker	46.70	25.3	11.8	.0284 ^{**}	.0938 [*]	n.s.	26.1
Unintelligent primary caretaker	0	11.4	35.3	.0106 ^{***}	n.s.	.0138 ^{**}	13.5

Source: International Food Policy Research Institute. "Consumption and Nutrition Survey, 1992" and "Positive and Negative Deviance Survey, 1993.

¹ Comparison between positive deviance and negative deviance

² Comparison between positive deviance and median growth

³ Comparison between negative deviance and median growth.

^{***} Significant at the 0.01 level.

^{**} Significant at the 0.05 level.

^{*} Significant at the 0.10 level.

Appendix Table 4-Practices related to hygiene

Practices	Positive deviance	Median growth	Negative deviance	Level of significance 1	Level of significance 2	Level of Significance 3	All
Trains children to:							
- Wash hands before eating	40.0	60.8	35.3	n.s.	n.s.	.0548**	53.1
- Wash raw fruits and vegetables before eating	6.7	24.1	5.9	n.s.	n.s.	.0942*	18.6
- Defecate in a particular place that is away from home and has no link with source of drinking water	20.0	25.3	5.9	n.s.	n.s.	.0786*	21.2
- Wash hands properly after defecation	46.7	48.1	23.5	n.s.	n.s.	.0639*	43.4
Cover the food	86.7	90.1	88.2	n.s.	n.s.	n.s.	89.6
Clear off human and animal feces immediately	80.0	42.0	58.8	n.s.	.0067***	n.s.	50.4
Throw garbage in a whole and cover it with soil or ash	80.0	81.5	70.6	n.s.	n.s.	n.s.	80.0
Use cup and spoon, not bottle for feeding	93.3	80.2	82.4	n.s.	n.s.	n.s.	82.6
Do not allow children eat unhygienic things	40.0	29.6	11.8	.0656*	n.s.	n.s.	29.6
Drink tubewell water	100	100	94.1	n.s.	n.s.	.0302**	98.6
Store water hygienically	85.7	70.4	73.3	n.s.	n.s.	n.s.	71.0
Suffered from diarrhea	26.7	48.1	58.8	.067*	n.s.	n.s.	46.9

Source: International Food Policy Research Institute. "Consumption and Nutrition Survey, 1992" and "Positive and Negative Deviance Survey, 1993.

¹ Comparison between positive deviance and negative deviance

² Comparison between positive deviance and median growth

³ Comparison between negative deviance and median growth.

*** Significant at the 0.01 level.

** Significant at the 0.05 level.

* Significant at the 0.10 level.

Appendix Table 5-Some other dietary practices

Practices	Positive deviance	Median grower	Negative deviance	Level of significance ¹	Level of significance ²	Level of Significance ³	All
Child's food is specially prepared or processed, %	26.7	22.8	0	.0228	n.s.	.0290**	19.8
Child has priority in eating freshly cooked food, %	86.7	78.5	64.7	n.s.	n.s.	n.s.	77.5
Child has priority in eating when food is scarce, %	86.7	88.6	88.2	n.s.	n.s.	n.s.	88.3
Food items eaten in the family but withheld from the child, no.	0.13	0.04	0.59	n.s.	n.s.	.008	0.13
Mother follows restricted diet after delivery, day	9.29	28.91	80.75	n.s.	n.s.	.082	34.05
Lactating mother follows restricted diet, %	86.7	96.2	94.1	n.s.	n.s.	n.s.	94.6
Lactating mother follows restricted diet during child's illness, %	71.4	85.9	82.4	n.s.	n.s.	n.s.	83.5

Source: International Food Policy Research Institute. "Positive and Negative Deviance Survey, 1993.

¹ Comparison between positive deviance and negative deviance

² Comparison between positive deviance and median growth

³ Comparison between negative deviance and median growth.

*** Significant at the 0.01 level.

** Significant at the 0.05 level.

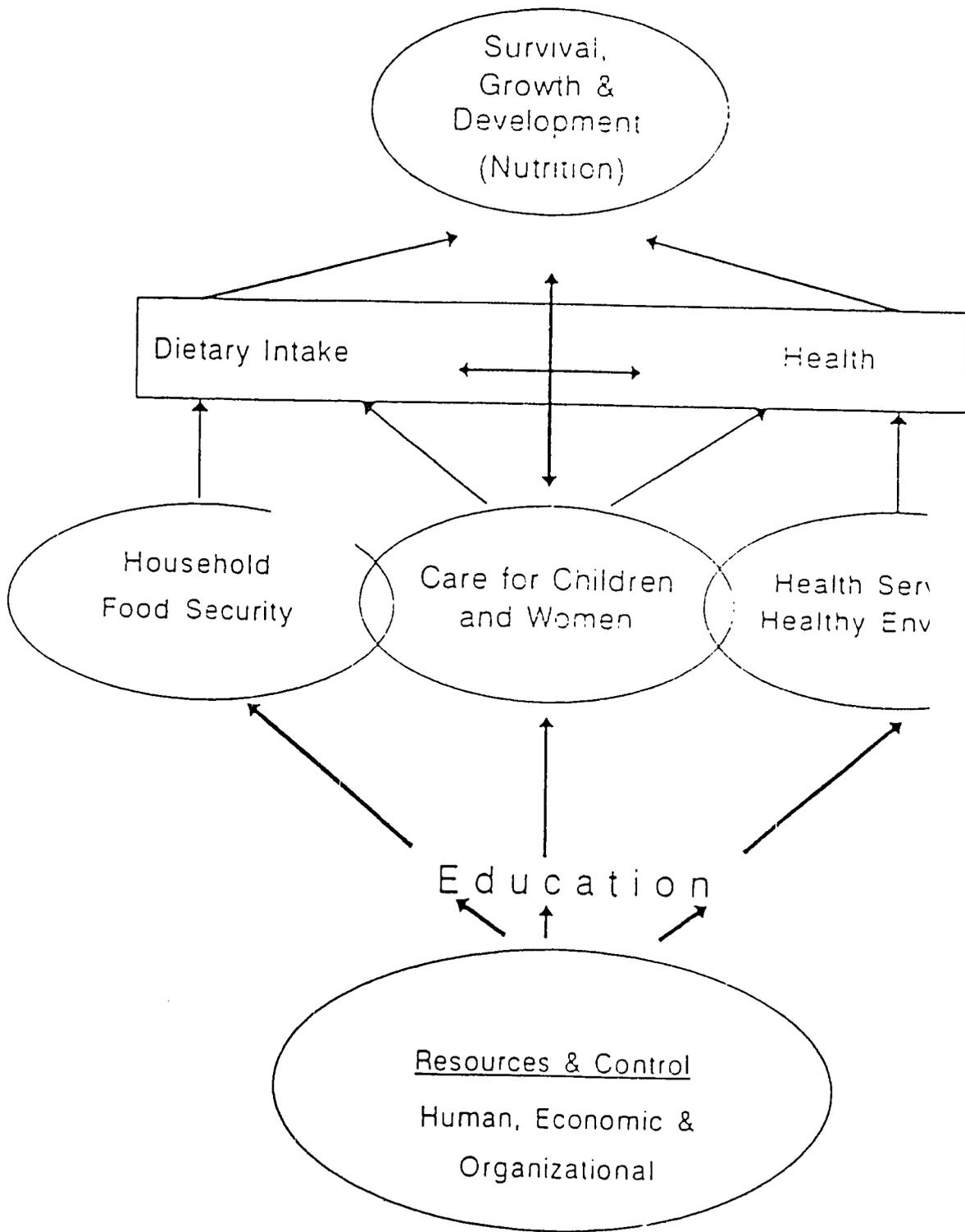
* Significant at the 0.10 level.

Appendix Table 6-Determinants of positive and negative deviance

Determinants	Positive deviance	Negative deviance
Calorie intake	+	+
Child's age	+	+
Sex (dummy)	+	+
Birth Order	-	-
Low-birth weight child (dummy)	-	+
Breastfeeding is continued until breasts are emptied	-	+
Weaning starting age is less than four months (dummy)	+	+
Suffered from diarrhea within last two weeks (dummy)	+	+
Mother's weight	-	+
Primary caretaker often sick (dummy)	-	+
Primary caretaker able to understand and respond to the physical and emotional needs of the child (dummy)	+	-
Primary caretaker listens to radio program related to nutrition and child care (dummy)	+	+
Primary caretaker's role is negligible in decision making process in the family (dummy)	-	+
Primary caretaker satisfied with her family life (dummy)	-	+

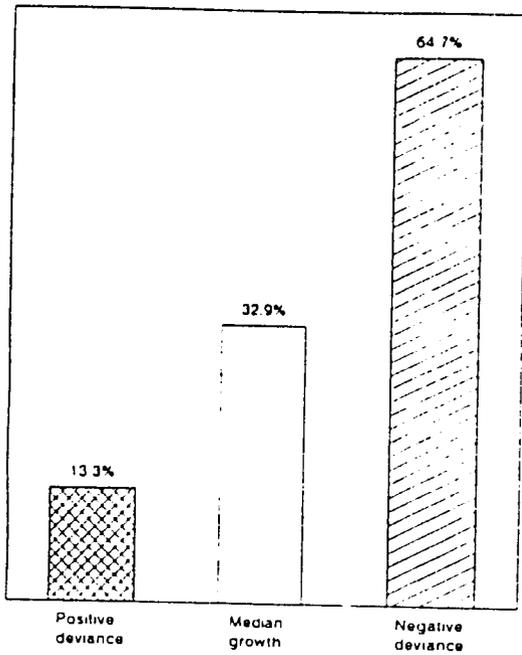
Note: "+" indicates factors determining positive and negative deviance.

- * Factors that have policy implications.
- * Factors that may have policy implications.



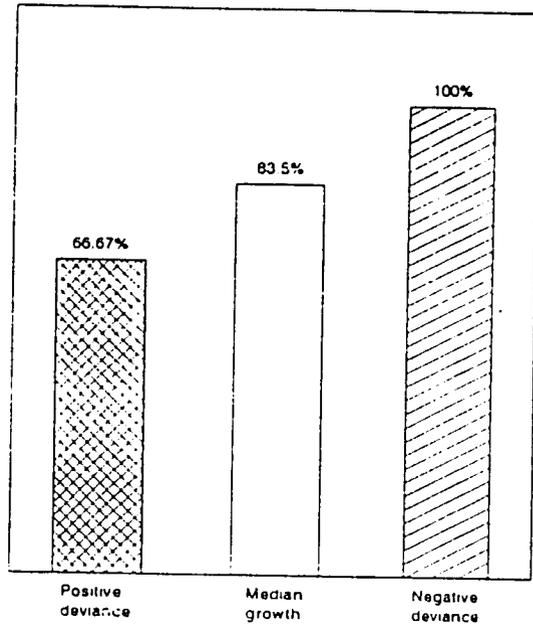
Source: UNICEF

Appendix Figure 2: Weaned precariously,%



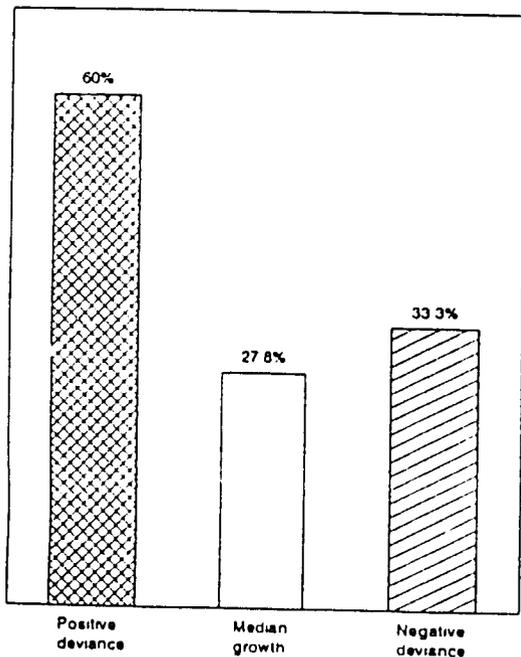
Source: International Food Policy Research Institute
"Positive and Negative Deviance Survey, 1993"

Appendix Figure 3: Breastfeeding not continued until the breasts are emptied,%



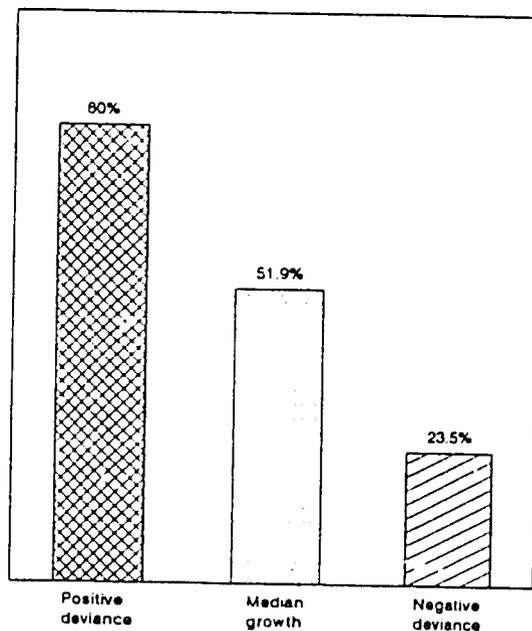
Source: International Food Policy Research Institute
"Positive and Negative Deviance Survey 1993"

Appendix Figure 4: Treated by certified doctors,%



Source: International Food Policy Research Institute
"Consumption and Nutrition Survey, 1992"

Appendix Figure 5: Caretakers listening to radio programs on child care,%



Source: International Food Policy Research Institute
"Positive and Negative Deviance Survey, 1993"

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