Responses during 1998 flood in Bangladesh: Is different targeting needed during emergency and recovery to tackle malnutrition ?

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Summary

Bangladesh suffered the worst flood of the century during July-October 1998. The government of Bangladesh appealed for international assistance. To provide valid information for designing an appropriate intervention to tackle malnutrition problems, a rapid nutrition assessment survey was conducted to look at the nutrition situation, problems encountered by the community, their coping mechanisms and rehabilitation priorities in six rural (charland) areas of Bangladesh. The survey was repeated after 4 months to see the outcome of activities during flood and the necessity for future assistance. Of the 3048 children measured in two rounds (1597 & 1451), 180 cases were found to be common in both rounds and a secondary analysis was done to see their progress in nutritional status and to formulate a strategy for future intervention.

The analysis found that while moving from crisis (flood period) to rehabilitation (post-flood) phase there was a clear evidence of a cross over phenomenon in the recovery pattern of nutrition status. There were 13 percent of children (68% of all malnourished) who were malnourished (whz <-2SD) during the crisis period and could recover enough to cross the cut-off point and became normal after 4 months. Another 8 percent of children (9% of all normal) who were normal during the crisis period but deteriorated to the level that they crossed the cut-off point to become malnourished after 4 months. As a result, despite being a shift in the overall distribution of nutrition status, there has been an internal shift that reduced the net effect. Subsequent episode of diarrhoea, access to food and loan burden had also influenced the recovery pattern of the children's nutritional status as evident from the statistically significant association. The finding of the analysis raise the question of relevance of targeting malnutrition during emergency and appropriateness of criteria used for targeting to assist which presumably is the same during crisis and rehabilitation phase.

Introduction

Bangladesh experienced one of the worst floods in its recorded history from late July until early October 1998. Some 30 million persons in 6 million families were affected by the crisis. The people of Bangladesh have extraordinary coping mechanisms for dealing with floods, which occur on a regular basis. But the scale and duration of the 1998 flood placed all these mechanisms under considerable strain, and there were serious concerns about the possibility of a large-scale famine similar to that which followed the floods of 1974. Many people exhausted all their assets and were forced into debt in order to survive the flood period. Many of the poorest families ran out of food supplies, and were forced to eat their seed supplies, sell their animals, and take high interest loans to pay for food and medical care. (Disaster Forum 1998, News Paper 1998)

Throughout Bangladesh, there was a wide spread mobilization of volunteer assistance during the flood to support both the community and external agencies. Immediate assistance came in the form of search and rescue when human lives were affected. Flood shelters were built by many agencies and others used the existing structures like community meeting places or schools. Food assistance was the most common form of assistance that came from outside. Global distribution of food was targeted to those at urgent need and the poorest section of the community. The government and many NGOs assisted by providing curative medical care in remote treatment centers or through mobile teams. Most teams traveled into remote areas to provide treatment for diarrhoea, acute respiratory infection and skin diseases. Nutrition interventions included supplementary feeding for those households who had a malnourished child and vitamin A capsule whenever a child with symptoms of night blindness was detected. Nutrition surveys were conducted on a small or large scale by many agencies to decide whether specific nutrition interventions were needed and this study was part of that

process.

After the emergency phase rehabilitation activities were initiated. They included repair of damaged houses and supply of agriculture products like seeds, fertilizer etc. Many NGOs organized cash for work programmes, as a means of providing beneficiaries with income for household consumption needs, as well as to regain productive assets. Cash grants and interest free loans were also provided by many agencies. Targeting was directed towards those most in need predominantly using the presence of malnourished children in the family as a proxy. However, whatever the intervention, many experts and evaluators have questioned the efficiency of targeting the true beneficiary and how far assistance can reach beneficiaries outside regular credit-savings schemes of NGOs. Some even questions, even when the recommended targeting is done well, whether targeting works at all. (Young 2000) .

The present paper presents findings from the follow up of a cohort of children and underlines the need to consider different indicators for targeting during the emergency phase of a disaster and during the rehabilitation phase.

Materials and Methods

Study areas

Two cross sectional surveys were done in flood-affected areas of Bangladesh situated on the bank of the Jamuna river, the main responsible for the monsoon floods. The river originates in the mountains of neighbouring India, enters Bangladesh through it's northern border and ends at the south in the bay of Bengal. All the study sites consisted mainly of charlands (small islands in the chest of the river or near shores). They are stretched over 7 thanas (the lowest functional administrative unit holding a population of about 200,000) that falls under the geographical boundary of 5 districts. They are Roumari and Ulipur under Kurigram district, Fulchari and Shaghata under Gaibandah district, Dewanganj under Jamalpur district, Chouhali under Sirajganj district and Naria under Shariatpur district. The sites are located in the upper, middle and lower part of the course of the river and approximately 40-50 km apart. Despite the disperse location of sites, the background characterisitcs and livelihoods of the people remain very similar in all places.

Livelihoods of char-dwelling families

Most of the char-dwellers are effectively land-less. They either don't have land or have lost land in the river erosion. The quality of the land is usually very poor. They rarely find other income generating opportunities than low yielding farming, cattle/goat rearing, or 'migratory labour', activities very prone to the effects of floods and droughts. Periods of accretion provide opportunities to accumulate resources but these may be washed away again in the next flood or in the process of river erosion. The charland people have also very limited access to basic services like education and health care. To gain access to land, employment and, particularly, to cope with emergency and stress, many char-dwellers have to depend on loans, mostly from private money lenders or 'mohajons' who charge interest rates up to 200

percent a year. Despite the fact that these loans bindpeople to a process of long-term exploitation, they provide some protection against uncertain stress. Very few char-dwelling families succeed to migrate to a more secured less flood prone environment

Study period

Two separate surveys were done in two different periods; in August at the peak of the flood and in December, the post-flood harvesting period. During flood (August), unemployment is high and food supply low. Many people depend on relatives or relief for food. The water and sanitation situation deteriorates severely, morbidity increases and there are more malnourished children. All these variables show a significant improvement during the second survey round in December.

Study Sample

Sample size was estimated on the assumption that p (probable proportion of malnutrition in population) was 20 percent, z as a constant (1.96) at 95% confidence interval and 5% acceptable error. 200-250 children were needed in each of the six areas. ta Multiple stage cluster sampling was done for each survey round following WHO guidelines (WHO 1995, Hossain and Shuaib 1998). The sampling frame was constructed to include all unions in the study areas affected by flood. Information on the level of flood was collected from the Flood Control and Warning Centre at Dhaka (the capital of Bangladesh). A list of villages was made based on the Population Census Report (BBS 1991) and constituted the sampling frame. Villages were randomly selected as Primary Sampling Units (PSU) by probability proportional to size. Selected villages were then divided into segments or clusters of 30-40 households and one of the segments were chosen randomly. A total of 60 clusters in 6 areas were visited and surveyed during 1st round. All the households in a cluster were visited but

only those with at least one child of 6-59 months were interviewed. During the 2nd round, all those clusters were visited again but the survey could be done in 56 clusters because 4 clusters refused to have their children measured. *There is something fishy here. If the same clusters are taken then why are there so few children in both surveys. I thought that the sampling was done again the second time.*

A total of 1597 children aged 6-59 months were measured for nutrition assessment during August 1998 and 1451 children during December. Of those children, 180 children were found to be common in both rounds and distributed almost uniformly over the six areas. These cases were considered for secondary analysis and form the cohort to look at the recovery pattern or progress of their nutrition status.

Data collection method

A total of 12 teams (3 members in each team) conducted the survey in less than 2 weeks and all of them were trained at the beginning of the survey. The household head or next responsible person was interviewed and the children measured for weight and height. Children were weighed with Salter scales (GLASS SALTER, 25 kg x 100g, made in England, approved by UNICEF) calibrated daily. Length (for children upto 2 years) was measured with child supine and height (children more than 2 years) was measured with child in erect posture using a length measuring board prepared according to standard guidelines (United Nations 1990a, 1990b). Weight for age, weight for height and height for age were calculated using anthropometric software obtained from EPINUT. The nutritional indices were expressed as standard deviation scores (z scores) of the reference medians.

Definition of variables

A household was defined as a group of people who cook together (BBS 1998). Household information included age, sex and education of the household head. Head of the household is someone whom others consider to be so, usually the eldest person. Amount of land here includes both homestead and agriculture land. Absolute landless meant having no land whereas function landless meant having land less than 50 m^2. Asset value was calculated by estimating the price of individual items in the household if sold at a normal functioning market at the time of survey. Asset loss was calculated in taka (1 US$ = 50 taka approx.) by deducting the sells price from the estimated value (perception of the respondent crossed by the interviewer) in the normal functioning market. The possibility to over-estimate was balanced by seeking a second opinion from neighbours in case of doubtful estimation by the respondent. In case the asset was damaged by water or stolen, the total estimated selling cost was considered as loss. Proportion of asset loss was calculated by dividing the total asset loss by the total value of the assets. Loan burden was assessed by asking about the total amount loaned and then checked with each source like relatives, mohajon, NGO, etc. Amount of loan was dichotomised at 3000 taka as several NGOs gave a crisis credit of 3000taka. Source of food for last week was categorised as own stock, loan or relatives and donation. Assistance was defined as receiving money, rice, other food or major items either from local or external agencies.

Morbidity was reported by seeking information on any episode of diarrhoea (three times watery stools in 24 hours) in the week preceding the survey. Although nutritional status is classified as Stunting, Wasting and Underweight, wasting is mainly used in this study because it is considered as the most appropriate indicator to measure acute malnutrition (UN 1990a & 1990b). Moreover, the other two indicators were difficult to rely on because of difficulty to assess accurately the age of the child (WHO 1995). Changes in nutrition status

between the survey rounds were computed by deducing the weight-for-height z scores of first round from those of the second round

Data analysis

Data was entered into the computer using data base software (FoxPro 2.6) and analysed in statistical package programmes (SPSSPC 9.0 & EPI Info 6.0). Anthropometric measurements were compared with NCHS median and z scores calculated using EPINUT.

Results

A total of 180 children were measured during August and December 1999. Of those, 56 percent were boys and 44 percent girls. There were 17 percent children malnourished (WHZ score <-2 SD) in August and 12 percent in December (p 0.011). Although there was net improvement of 5 percent in the malnutrition prevalence, the recovery pattern was not that straight forward.

Figure 1

Figure one gives the natural history of the nutritional status of the children from August to December. 90 percent of the malnourished children improved with 82 percent returning to a cut-off above -2 SD, her defined as 'normal'. In contrast, half of the children who were well (W/H ≥ -2 SD) saw their nutritional status worsen so that in December 9 percent them became malnourished. Of the whole cohort, 57 percent improved and 43 percent declined in nutritional status although the overall prevalence declined from 17 percent to 12 percent. 14 out of 23 malnourished (64%) were ”new” cases or previously normal children. We can thus observe an important cross-over phenomenon.

Table one compares a number of variables between the two classes, children who improved in W/H versus children who declined and children became malnourished (W/H < -2SD) versus children who normalised in W/H, children who crossed over. The loan burden seemed to have a strong association with the recovery pattern when any improvement or decline was considered as the outcome. When crossing over is considered as an outcome, proportion of asset lost, either single or repeated episode of diarrhoea and source of food during the week

preceding the survey of December were found to have a significant relationship. The rest of the variables showed some trend but there was no statistical significant association.

Table 1

Although not significant, the proportion of male children was almost similar in both the groups who improved or declined (52% versus 61%) but more boys became malnourished from normal as opposed to those who became normal (86% versus 55%). The percentage of non-school goers was slightly higher among those who improved, the mean level of education was always higher among the same groups. *This paragraph is funny. What about the age? The education is of whom?*

The proportion of absolute landless families did not vary significantly among the groups. The total asset value was higher in the group who went from malnutrition to normal but they were also the groups where significantly less people lost more than 95 percent of their assets. In the group who had children who became malnourished, 50 percent had virtually lost everything.

Almost all people had to take some loan during or after the flood but there is a variation in the sources. Although the proportion of loans from a mohajon was very similar among those who either improved (62%) or declined (65%), the mean amount was much higher in the groups who declined (3854 taka) than for those who improved (2423 taka). Even so, the proportion of families who took a loan of more than 3000 taka was higher among those declined (25% versus 12%). The difference in the loan amount among the groups was significant (p 0.022). Other lending sources were protective , like neighbours or banks. The

proportion of families who hasd access to loans from neighbours, family or banks was higher among those who improved than those who decline (13% versus 8%). None of those who declined from normal to malnutrition had any access to such type of loan. The mean loan from other sources was also higher among those who improved (3473 taka) than declined (2583 taka).

Episodes of diarrhoea had some relationship with crossing over of cut-off points but not with simple improvement or decline in nutritional status. 64 percent of the children who were malnourished in December had an episode of diarrhoea in the week prior to the study of August. This was 27 percent for the children who normalised their malnutrition by December. This relationship was significant (p 0.028). The association between worsening of nutritional status and repeated episodes of diarrhoea was even more pronounced. In August, 43 percent of the normal children who became malnourished had repeated diarrhoeal episodes compared to 5 percent in the group who were malnourished but became normal. (p 0.005; OR 15.8; CI 1-41)

The children of families who had access to various sources of food had more chance of improving than declining. Although the proportion of those who did not have any access or did not want any loan or donation for food was very similar among various groups during the flood period (August), it varied during December. The difference in proportion did not matter much for mere improvement or decline but made a significant difference in turning normal to malnutrition or the reverse. 79 percent of those who deteriorated to be malnourished were depending only on their own stock for food which was only 36 percent in the other group (p 0.013; OR 6.4; CI 1.4 - 30). This meant that they had less access to food either through a loan from relatives or donation form local or external agencies.

Table 2

When looking at the background or criteria for assistance, it was found that those who were NGO members, were land less, had higher loan burden, more compromised food habits and had malnutrition during flood got more assistance than the others (see table 2). Although not significant, proportion of malnutrition during August was slight higher (18%) among those who got assistance than who did not (16%), it was reverse during December (11% versus 15%). The proportion of NGO members were significantly higher among those who got assistance than who did not (44% versus 23%, p 0.005). The absolute and functional land less families received also more assistance than those who did not get (43% versus 29%; p = .053 and 79% versus 63%; p 0.015). It was interesting to see that the proportion of families who lost more than 95 percent of their assets were also less among those who got assistance than those who did not get (30% versus 49%; p 0.014). Although the proportion of loans from mohajon or other sources were similar in different groups, the mean amount of loan from mohajon was much higher among the assisted group than the other group (4363 taka versus 2818 taka; p 0.017). This was reverse in case of loan amount from other sources (3441 taka versus 2381 taka; p 0.045). *There is also something wrong here 4363 it the total 3441 comes from the mahajon (see table). I am also confused here. What does this demonstrates???*

Nutrition status improved from August to December when land tenure in August was higher (r= 0.19; p= 0.022), proportion of asset loss smaller (r= -0.262; p= 0.001), the loan from mohajon smaller (r= -0.171; p= 0.011) and loan from other sources higher (r= 0.171; p= 0.001).

Conclusion

In the study area, almost every one was affected by flood and hence it is difficult to isolate specific factors that could have influenced the vulnerability of a child to become malnourished during flood or its recovery afterwards. During flood, all the socio-economic factors declined which was evident from the extremely high unemployment rate. Food stocks were exhausted leading to more households depending on loans or donations for their daily food. . Similar findings were reported by other agencies as well (HKI-NSP 1999, Hossain and Shuaib 1998).

Negative impacts of a natural disaster on child malnutrition have been reported by several studies in Bangladesh (HKI-NSP 1999, Chowdhury and Bhuiya 1993). The studies demonstrated an association between malnutrition and education level of the care-givers, land ownership and reported illness (Bhuiya et al 1986a). A high rate of diarrhoea during flood was reported in some studies (Briend et al 1987, Stewart et al 1990, HKI-NSP 1999, Hossain and Shuaib 1998). Nutrition status was also associated with the health seeking behaviour before and after each episode of illness, gender preferences and age of children (Bhuiya et al. 1986b, Briend et al 1989). Most of these findings have been confirmed by the surveys done in our study area which were reported previously (Hossain 2000)

This study observed an increase in the malnutrition rate that was higher than the national average (BBS 1997) but how the associations between the nutrition status and other factors affect on the recovery pattern of the children with malnutrition is however not clear. One of the striking finding in the present study was the cross-over phenomenon i.e., some children improved from malnutrition to normal while others deteriorated from normal to malnutrition when they move from crisis to rehabilitation period. Ultimately the impact on the prevalence

of malnutrition is a mixed effect and the net improvement is reduced by the cross-over phenomenon, 61% of all the malnourished children of the recovery period are new cases.. Although the study is obersvational with all its lilmits, some interesting observations can be made There was a significant higher proportion of asset loss, loan burden and in particular the type of loan in families where children became malnourished.

Mohajons are the money-lenders who lend money at very high rates (some times 200 percent a year) at the moment of crisis and poor people with minimal reserves or collateral are forced to take loans from these mohajons. Inability to pay back the money usually ends in loosing the remaining assets or provide free labour for any amount of days decided by the money-lenders.. Unfortunately, the loan from mohajon is negatively correlated with the progress in nutrition status. On the other hand, having an access or ability to take loan from other sources (banks, neighbours etc.) with long-term repayment schedules at a very low or no interest was positively correlated with the improvement of nutrition status. This suggests that flood-affected families need to be assisted prior to the moment when they exhaust their resources and are forced to take loans from mohajon or that their accessibility to other loans should be widened.

The other factor that seemed to have some influences on the recovery pattern was the repeated attacks of diarrhoea. Although there was association between an attack during flood (August) and deteriorating from normal to malnutrition, it was absent when checked with an episode of diarrhoea during December. The association became even stronger when it was checked with those who had repeated episodes of diarrhoea i.e., during flood (August) and post-flood period (December). It has been documented earlier that reported illness due to diarrhoea remains high during and immediately after flood. Despite this fact, deterioration

from normal to malnutrition could be stopped if the repeated episode of diarrhoea could be prevented by taking adequate care of those who once become ill during flood any way. Diarrhoea control seems a top priority in flood affected areas, next to efforts to rehabilitate.

The third and probably most interesting finding of this study is criteria for assistance was not very suitable for all periods of the emergency. It seems that eligibility criteria for assistance need to be different for the immediate crisis and the rehabilitation Results show that those who were poor and in need during flood were helped. It appears that those who had a malnourished child during flood (crisis) had more possibility of getting assistance, which fits with the anhtropometric criteria used by agencies involved in the flood response. However, crisis is not the same as recovery. In a crisis situation the aim is to save as many lives as possible. It is therefore legitimate to target assistance based on clinical criteria such as malnutrition. But in a rehabilitation or recovery phase the situation becomes completely different, in particular if the flood affects all people indiscriminate of their socio-economic condition. Some one who coped and survived well during the flood might have exhausted all his assets during flood. He would be more vulnerable in the rehabilitation phase in comparison to some one who was poor and vulnerable during flood and was assisted by alocal or external agency. Moreover, assistance was targeted at the land ownership and missed the fact that those who lost almost everything (more than 95 percent of their assets) were more vulnerable than those who lost less. Their coping capacity is stretched to the limit and the possibility of recovery is small. Since they are not eligible for a “normal” or “soft” loan, they are forced to find money at very high interest rates. Asset loss was significantly associated with deterioration from normal to malnutrition.

A last is that more beneficiaries of assistance were members of an NGO. NGOs claimed that they consulted the local community to identify appropriate beneficiaries. The current findings may allow critics to raise the question whether aid agencies help the affected people in general or aim first to promote their own development programme and help their own beneficiaries. (Young 2000) However, it could also be that most of the NGO members were among those vulnerable group who required assistance more than others.

The results of the present study have to be interpreted with care. An observation of a cross-over phenomenon was made, some associated factors were identified and an explanation is available. However, this was not a longitudinal design, the numbers are small and information on asset losses could be biased due to a hidden expectation for relief. We do feel however that the findings merit further consideration and particular attention, certainly in future disaster episodes. We strongly feel that during a disaster of large scale that spares almost none, all should be helped. If targeting needs to be done due to lack of resources, there should be two separate criteria for assistance, one for the crisis period and the other for the rehabilitation. It was also strongly felt during the analysis that there should be more well-designed longitudinal studies set up in periods of flood to look at those issues more carefully and come-up with appropriate recommendations. Sensitive indicators should be tested that will be easily applicable by community people but appropriate to respond to the problems of that period and of that place.

Acknowledgement

We would like to acknowledge the contribution of Save the Children Fund UK who funded the initial surveys through the money that came from 'DEC appeal 1998'. We are grateful to Lola Gostelow, Emergency Advisor and Anna Taylor, Nutrition Advisor, SCF-UK for their encouragement, questions and comments during the whole period of this study. We are indebted to Martine Billanou, Programme Director of SCF-UK Bangladesh Programme who managed to sponsor a visit to Bangladesh during the current study for data re-organisation. Thanks to Muhammad Shuaib and Abdullah-Al-Harun of SURCH for their support during the initial surveys and the secondary analysis. We are also indebted to the children and their parents who were affected during the flood but always co-operated during the data collection. The views expressed in this paper are exclusively those of the authors and not related to the work of Save the Children Fund UK any way.

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Fig 1: Recovery outcome of the children from 1st round to 2nd round in terms of malnutrition status

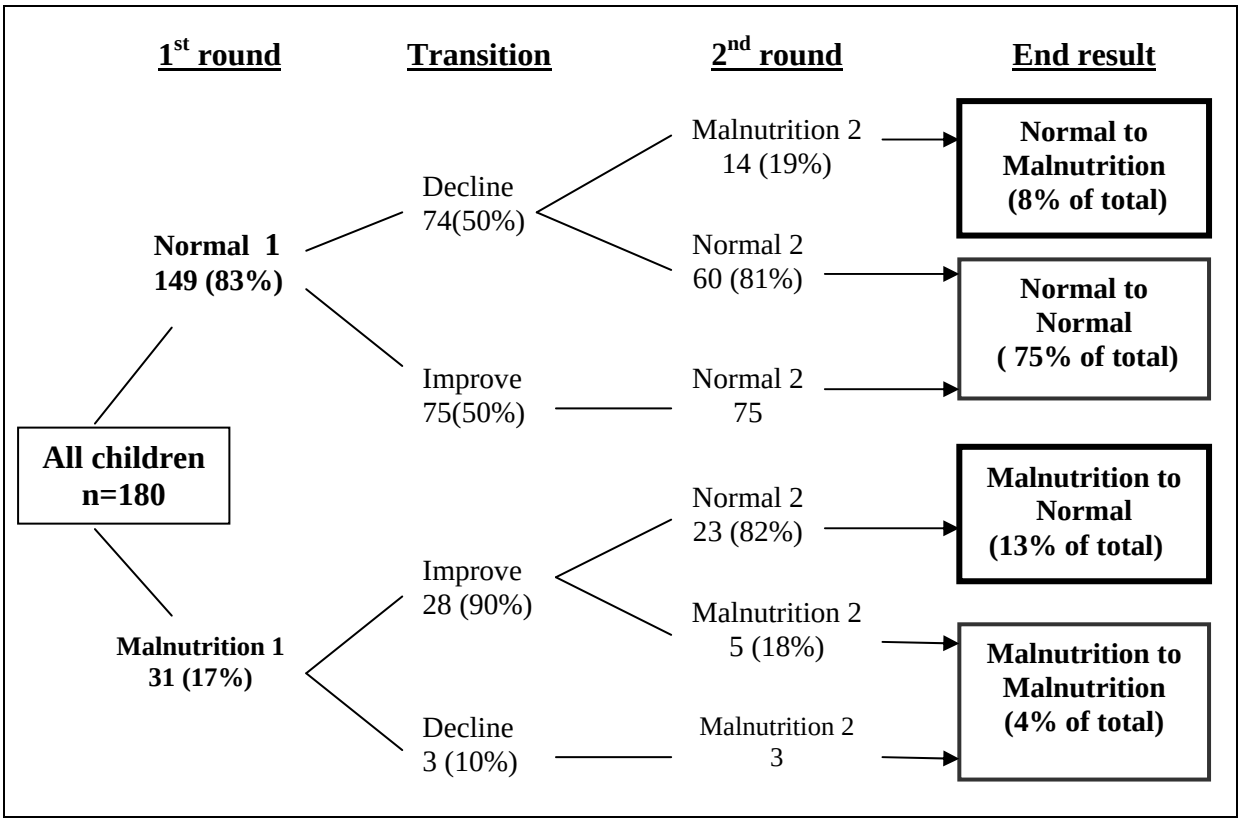

Table 1: Comparison of means of different variables and type of recovery in nutrition status of the children during and 4 months after flood

Variables	Change in nutrition status			Crossing the cut of point		
	Declined	***Improved***	***OR (CI)***	***Normal to malnutrition***	***Malnutrition to normal***	***OR (CI)***
	N= 77	*N= 103*	*N= 180*	*N= 14*	*N= 22*	*N= 36*
% of male child	61	52	1.5 (.8– 2.7)	86	55	5.0 (.9-27.8)
Mean year of schooling (SD)	6 (2.8)	7 (3)		6.5 (3.7)	7 (4.3)	
% land-less	33	41	.7 (.4 – 1.3)	43	36	1.3 (.3-5.1)
% who lost >95% assets	36	38	.9 (.5 – 1.7)	50	10	9.5*(1.6-57)
% loaned from Mohajon	65	62	1.1 (.6– 2.1)	79	55	3.1 (.6-14.3)
Mean amount of loan in taka (SD)	3854 (4377)	2423+ (1647)		2218 (1972)	1875 (1076)	
% of families loaned >3000 tk	25	12	2.5*(1–5.5)	21	5	5.7 (.5-61.7)
Proportion loaned from others	8	13	.6 (.2 – 1.6)	--	1	
Mean amount of loan in taka (SD)	3473 (2464)	2583 (1562)		---	2000	
% of diarrhoea 1st	33	36	.9 (.5–1.6)	64	27	4.8*(1 -20)
% of diarrhoea 2nd	30	26	1.2 (.6– 2.3)	57	32	2.9 (.7-11.4)
% repeat diarrhoea	13	13	1.0 (.4-2.5)	43	5	15.8* (1-41)
Own food stock 1st	66	63	1.2 (.6 2.1)	71	77	.7 (.2-3.4)
Own food stock 2nd	52	54	.9 (.5 – 1.6)	79	36	6.4* (1.4-30)
% got assistance	61	58	1.1 (.6– 2.1)	50	64	.6 (.2-2.2)

* p value significant (<.05) using chi-square test

\+ p value significant (<.05) using student t test

Table 2: Background characteristics of those who got any assistance or not

Variables	**Status of getting any assistance**		
	Yes	***No***	***OR (CI)***
	N= 107	***N= 73***	***N=180***
% of malnutrition during Aug 1998	18	16	1.1 (.5-2.6)
% of malnutrition during December 1998	11	15	.7 (.27 - 1.9)
% of NGO members	44	23	2.6 (1.3 - 5.3)
% of absolute land less families	43	29	1.9* (1.0 -3.5)
% of functional land less families	79	63	2.3* (1.2 - 4.4)
Proportion who lost >95% assets	30	49	.45 *(.2-.8)
Mean amount of total loan taken (SD)	4363 (4852)	2818+ (2200)	
Proportion of loanee from Mohajon	67	58	1.5(.8-2.8)
Mean loan from Mohajon (SD)	3441 (3710)	2381 (1978)	
Mohajon loan >3000 taka	31	21	1.6 (.6 - 4.3)
Proportion loanee from others	10	11	1.8(.8-4.2)
Mean loan from other sources	4045 (2433)	2018+ (1192)	

* p value significant (<.05) using chi-square test

\+ p value significant (<.05) using student t test