Does Combining Infant Stimulation With Emergency Feeding Improve Psychosocial Outcomes for Displaced Mothers and Babies? A Controlled Evaluation From Northern Uganda

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Combined psychosocial and nutrition interventions improve the development of infants. However, there is a paucity of studies examining the effectiveness of such interventions in humanitarian settings. This article examines the impact of combining a group-based psychosocial intervention with an existing emergency feeding program for internally displaced mothers in Northern Uganda. The intervention consisted of mother and baby group sessions and home visits for mothers attending 3 emergency feeding centers. Psychosocial outcomes were compared with a contrast group of mothers who received nutritional support alone. The outcomes investigated were infant stimulation and maternal mood. After controlling for the effects of interview site and baseline scores, mothers in the intervention group ($n = 70$) showed greater involvement with their babies, more availability of play materials, and less sadness and worry at follow-up in comparison to the contrast group ($n = 77$). The intervention was acceptable to the mothers and easily taught. A proportion of the mothers chose to continue the intervention spontaneously with other mothers in their neighbourhoods. Further research needs to be done to validate these preliminary findings and explore the longer term impact on child growth and intellectual development as well as maternal mood.

A n estimated 156 million children under 5 years of age in the developing world have significantly impaired growth (Walker et al., 2007). During the first 3 years of a child's life, the brain is most plastic, grows fastest, and is most responsive to the outside environment (Grantham-McGregor et al.,

2007). Undernutrition and malnourishment in this period limit children's chances of survival and severely affects their long-term growth and mental development. However, it is not only the lack of food that has such profound effects. Children's interactions with their caregivers and the amount of cognitive stimulation they receive also affect the kind of adults they become, with deficiencies in these areas stunting long-term emotional, social, physical, and intellectual development (Black et al., 2008).

A number of studies in low-resource settings have combined stimulation and nutrition and have shown enduring benefits for both child and caregiver (Engle et al., 2007). In the poorest and most malnourished children, combined programs appear to improve child growth and psychological development (World Health Organization Department of Child and Adolescent Health and Development, 1999). A study of the impact of providing food supplements and stimulation to stunted and

nonstunted 9–24-month-old children in Jamaica showed that stunted children who received both interventions weekly over a 2-year period had higher developmental scores than those who received neither or only one intervention (Walker, Chang, Powell, & Grantham-McGregor, 2005). Moreover, programs designed to improve parenting and mother–child interactions through home visits and group interventions may also improve maternal mood and well-being (Baker-Henningham, Powell, Walker, & Grantham-McGregor, 2005; Barlow, Coren, & Stewart-Brown, 2003).

The World Health Organization advocates the integration of psychosocial stimulation into emergency feeding programs (World Health Organization, 2006). One randomized control study of a 5-month-long group psychosocial intervention conducted with war-affected mothers and slightly older children (average age 5 years) in postconflict Bosnia showed a positive impact on maternal mental health and child weight gain (Dybdahl, 2001). There are no other studies that evaluate the impact of combining infant stimulation with nutrition on mothers and children under 3 within conflict or disaster affected populations in low-income settings (Jordans, Tol, Komproe, & de Jong, 2009). This is an important gap, because the most impoverished and vulnerable infants will be found in such situations, and there is a need for easily administered interventions that can assist them.

For this reason, International Medical Corps (IMC), an international health nongovernmental organization, decided to evaluate the impact of adding a psychosocial component to an established emergency feeding program for internally displaced infants and their mothers in Kitgum district of Northern Uganda. The objectives of the study were to determine whether adding a psychosocial component improved psychosocial outcomes (i.e., maternal knowledge of early child development, infant stimulation, maternal mood) in the mothers and infants who received the combined intervention compared to mothers and infants who received only nutritional support. The study also allowed us to examine the feasibility of combining research with the delivery of humanitarian services in emergency settings.

Method

Setting: Northern Uganda, Kitgum District

More than 20 years of war in Northern Uganda between government forces and the Lord's Resistance Army (LRA) had left more than 10,000 people dead and 95% (2 million) of the predominantly Acholi population displaced and living in 200 camps. There were equal numbers of men and women and 20% of the camp population was under 5. The population was unable to cultivate because single family huts were closely packed and insecurity made access to fields difficult. The majority depended on food aid. Infant mortality was 165/1,000 live births, more than double the national rate for Uganda (88 per 1000), and there were high rates of malnutrition. IMC began nutritional support in 2003 and by 2007 had a well-established community-based feeding program at nine centers in the neighboring districts of Kitgum and Pader. This program followed established guidelines for community-based therapeutic care (Valid International, 2006). Severely malnourished infants with

medical complications received brief periods of inpatient stabilization followed by continuous weekly outpatient feeding using "ready to use therapeutic food" until they recovered, and moderately malnourished infants received fortnightly supplementary feeding. In both out patient groups this was combined with health education sessions on the topics of feeding practices, HIV, contraception, hygiene, and illness in the child. There was no education on early child development or infant stimulation.

The Psychosocial Intervention

The evaluated psychosocial intervention consisted of two components: (a) the establishment of six weekly mother and baby group sessions, where mothers were given culturally appropriate psychoeducation on early child development combined with the chance to discuss and practice with their babies and to share experiences and difficulties they had regarding child rearing, and (b) the implementation of home visits lasting 1–2 hr during the period of the intervention, providing further opportunities to discuss and practice what they had learned in the group and to share any problems.

The mother and baby group was the key component of the intervention. The group lasted between 90 min and 2 hr. Education on child development was combined with teaching and practicing simple age–appropriate play activities and toy making to enhance development in all areas, stimulate the child, and foster good caregiver-child relationships. It was conducted in a flexible and interactive manner, using what was happening in the group, combined with mother's experiences at home, as class material. For example, some of the liveliest discussions were over how to set limits and teach good behavior as mothers shared experiences of the costs and benefits of physical punishment, which had increased under the stresses of Internally Displaced Person (IDP) life. A final session was dedicated to how mothers could sustain what they had learned in the group or on their own with the aim of generating mother-to-mother transmission of knowledge.

Home visits were made by the psychosocial facilitator and nutrition support worker together. Standard nutritional education and monitoring were combined with discussion designed to reinforce the psychosocial knowledge disseminated in the mother-to-mother groups and to address specific behavioral or relational challenges, and to promote particular aspects of child development according to individual need and the home context. If a mother was defaulting from the group, this was also discussed. The training materials used in the intervention were adapted from the Learning through Play program (Hincks-Dellcrest Centre, 2002). These are multicultural, primarily picture-based materials that can be used to educate mothers with no or little reading skills on the importance of play, how to play, and the five key areas of child development: physical, intellectual, language and communication, relationships, and sense of self. They have already been used in a home visit program for rural women with 2-month-old babies in Pakistan (Rahman, Iqbal, Roberts, & Husain, 2008). The program also incorporated materials from other training manuals (International Child Development Programmes Oslo & Program on Mental Health, 1997; UNICEF, 2006). The content was adapted to the Acholi IDP context using the findings from a preliminary

ethnographic survey with 20 key informants consisting of IDP mothers and traditional birth attendants from the area as well as the opinions of the Acholi facilitators. The drawings were recreated by a local artist to reflect details of the Acholi IDP culture and context.

The intervention was conducted by trained psychosocial facilitators: university graduates who received 1 week of theoretical training in early child development, health education, and group facilitation plus on-the-job training in a six-session pilot group. All group sessions were cofacilitated by the psychosocial facilitator and a trained nutritional support worker, who had also received an initial theoretical orientation day and at least six more on-the-job training sessions. All training was completed before the research evaluation began.

Study Design and Selection of Participants

The study was conducted at the five established feeding centers in the Kitgum district. It contrasted two interventions: At three sites (K1, K2, and K3), attending mothers received nutritional support plus the psychosocial intervention. A sample of these intervention mothers (132) was compared on outcome measures with a sample of 105 mothers in a contrast group at two other Kitgum feeding sites (K4 and K5), who received the nutritional intervention alone. These mothers were wait-listed for the psychosocial intervention, which they received after the research was complete.

Humanitarian settings impose particular limitations on research design. Individual randomization was considered unethical, because randomly selecting mothers for any additional services in a highly vulnerable and needy population would create conflict between those selected and those not, even with wait-listing. All five sites were selected because of their similarities regarding living conditions and nutritional needs. All five sites had feeding centers that were accessible to the surrounding community. The main difference in terms of the sites was in the length of time it took to reach the communities. At that time, all travel in the area was insecure and, on occasion, required armed convoys. The intervention sites, which required more visits, were chosen solely on the basis of their proximity to the project office to limit travel time on the insecure highways between communities.

Purposive samples of mothers for each arm of the study were collected in the following way: All mothers with either moderately malnourished (70%–80% of normal weight for height) or severely malnourished (below 70% weight for height) infants aged between 6 and 30 months entering the combined psychosocial and feeding programs being conducted at sites K1, K2, and K3 were asked on admission if they would assist with an evaluation of the psychosocial program. They were told that this would consist of an additional interview and questionnaire at admission and discharge from the program. It was made clear to each mother that if she did not wish to join the evaluation she could still receive nutritional support plus the psychosocial intervention. A standardized informed consent form was read and explained to the mother. If she consented to the evaluation, she signed or marked the form. This process was continued at all three sites until a sample of 132 mothers was recruited for the intervention group. It took 5 months for the different batches of mothers to complete the 6-week group cycle. Group

size ranged from 7 to 25 persons with a mean of 16. At the same time, all mothers with moderately or severely malnourished infants between 6 and 30 months entering nutrition only programs being conducted at the two other Kitgum sites (K4 and K5) were asked if they would assist with an evaluation of the program. The same approach was taken as described above, and 105 mothers were recruited into the contrast group. These mothers were invited to receive the psychosocial intervention after the research evaluation was complete. It was explained clearly to all mothers in both intervention and contrast groups that there would be no material reward of any kind. No mothers refused the psychosocial intervention or the initial evaluation. Mothers whose infants were so severely malnourished they required inpatient care at the stabilization centers were excluded from the evaluation.

Postintervention data collection was affected by political and weather related events. Serious flooding in the region and security concerns sometimes made camps inaccessible, and the signing of the peace accords in August 2007 meant that many IDPs started to move home. Some mothers left the program earlier than planned, and tracing and follow-up were difficult in others. Twenty-six mothers in the contrast group and 53 mothers in the intervention group were lost to follow-up. Postintervention measurements were thus conducted on 78 intervention mothers and infants and on 79 contrast mothers and infants. The differential attrition rates between the contrast and intervention group are thought to be because conflict ended earlier in the intervention sites. After the peace agreement, the rebels left these areas first and mothers became more mobile. They were able to farm their own land and visit and stay with friends and relatives. Their land was often some distance from the camps. Thus, some mothers in the intervention group were out all day or moved away completely and were unable to be tracked down for the postintervention evaluation.

The number of home visits ranged from 0 to 3. Fourteen mothers (6% of the sample) had 0 visits. The median number of visits was 1.0 and the mean 1.32. For group sessions, the range was 0–6. Eight mothers (3.4% of the sample) attended 0 groups. The median number of groups attended was 5 and the mean was 4 sessions. Eight mothers were dropped from the per protocol intervention analysis, because they received fewer than three interventions (combination of home visits and group sessions), and two mothers were dropped from the contrast group because there was < 4 weeks between the administration of pre- and postmeasures. This information is summarized in Figure 1. The interval between pre- and postintervention measurements ranged from 4 to 32 weeks for those mothers who met study protocol. Correlations were run to determine whether the interval period between assessments was significantly associated with any of the outcomes. None of the correlations was significant.

Conducting the Intervention

During the research evaluation phase, the psychosocial intervention at sites K1–3 was administered by three trained Acholi psychosocial facilitators working together with trained Acholi nutrition support workers. Data collection was conducted by three data collectors with the same educational background and training as the psychosocial facilitators plus an additional
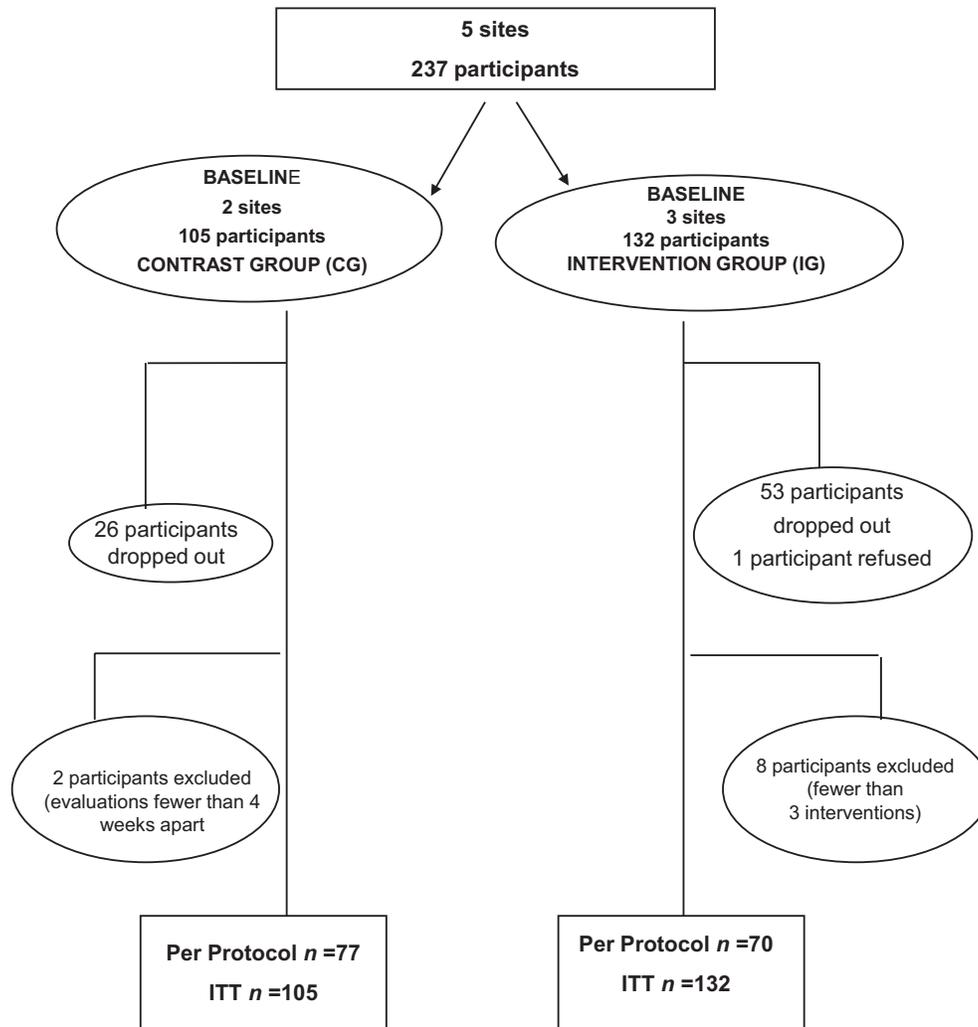
Figure 1. Participant flow diagram.

9 days training in data collection in which standardization and objectivity were emphasized. In general, they did not conduct any part of the intervention, and pre- and postintervention data were collected by separate evaluators, so that they were blind to the mother's earlier score. On very rare occasions, a data collector conducted one group because a facilitator was unwell. For similar reasons, data collectors occasionally conducted pre- and postintervention interviews on the same mother. Complete blinding was impossible, as the intervention and contrast groups were known to be located in geographically distinct areas. Bringing all the study mothers from both groups to a neutral place for interview could have addressed this problem, but security conditions, limited resources, and the constraints and demands on the mothers' own time made this logistically and ethically impossible. The collected data were reviewed by an independent clinical psychologist.

Outcome Measures

Three outcome measures were used to assess the impact of the psychosocial intervention: (a) the Acholi Home Observation

for Measurement of the Environment (HOME) was used to assess the impact of the intervention on mother's ability to stimulate her child, (b) the Kitgum maternal mood scale to assess changes in maternal mood, and (c) the Knowledge, Attitudes and Practice (KAP) test to assess changes in maternal knowledge of ECD. As we were looking for degree of change as opposed to diagnosing pathology, cutoff scores were not used. The Acholi HOME was adapted from the infant toddler version of the HOME Inventory (Caldwell & Bradley, 1984). It allows the evaluator to gain information on the quality and quantity of infant stimulation and support available to a child in a naturalistic manner during the course of a home visit. It has been widely used in the West, adapted for Bangladesh, and is internationally accepted. The Acholi version consisted of 50 items clustered into seven subscales measuring maternal involvement, variety, punishment, play materials, emotional and verbal responsiveness, acceptance, and organization. In each subscale, direct questions such as *Do you sing song/rhymes to the child?* and observations such as *Mother spontaneously vocalizes to child* were scored by the interviewer on a 3-point Likert scale of *often/sometimes/not at all*. If the home was not accessible,

interviews and observation of mother and child were conducted in a quiet space at the feeding center or the health center. The variety and organization subscales were not included in the analysis because of the low internal consistency of the items of these scales. Cronbach alphas for the remaining subscales were as follows (T1 α; T2 α): Maternal involvement (.53; .64), play materials (.66; .82), emotional responsivity (.61; .77), and acceptance (.54; .67).

A culturally appropriate symptom rating scale was developed to assess maternal mood (Bolton et al., 2007). During the ethnographic assessment, respondents were asked what problems they encountered in bringing up children and what sorts of feelings these problems produced. Three terms came up repeatedly: Cwer Cwinye (variously translated as bleeding heart, sad, aggrieved), Par (worry), and Kec Cwinye (bitter heart, sad, unhappy). Concepts in Acholi overlap, and they are used flexibly with the exact meaning depending upon context and user. All respondents were asked to explain each of the above concepts in detail, in particular, how an outsider would be able to recognize a person with each of the above. The descriptive terms used were then pile-sorted to identify the most common constructs for each feeling. This allowed for the creation of a 23-item symptom rating scale reflecting commonly experienced negative feelings, phrased in local language. The 23-item scale, at both time points, was factor analyzed to determine whether the scale could be reduced to a smaller number of factors. Using a principal components extraction method with a promax rotation, three factors were identified: a sadness/worry subscale, an irritability subscale, and a somatic complaints subscale. Items that did not consistently load on the same factor at both the preintervention and postintervention were dropped, as were items that had a factor loading of < 0.4. Scale items, factor loadings, and Cronbach's alphas are presented in Table 1. Higher scores indicate greater sadness/worry, irritability, and somatic complaints.

Maternal knowledge was assessed with a 10-item knowledge test in which mothers had to decide whether simple statements regarding child development and appropriate maternal actions

to foster it were true or false. The results of this scale were not further analyzed because the internal consistency of the scale was extremely low (α = .10 preintervention, α = .14 postintervention).

All three tools were backtranslated and retranslated to ensure conceptual clarity and were piloted for acceptability. All scales were administered in interview form to all mothers to avoid any difficulties for illiterate mothers.

Procedure

The research evaluation began in May 2007, and data collection was completed by January 2008. All baseline interviews were conducted within 1 week of admission to the nutrition program and, in the case of the intervention mothers, prior to their admission to the psychosocial program. The crowded conditions in which families lived meant that interviews with mother and index infant, conducted in or near the health or nutritional center, were subject to less interruption than those conducted at home, and the evaluators simply chose the most convenient and private location in each case. Ethical approval for the study was granted by the Uganda National Council for Science and Technology.

Data Analyses

Baseline characteristics were compared between groups with chi-square and independent sample t-tests, according to the metric characteristics of the data. To compare changes between treatment groups, pure change scores were calculated (t1−t2) on an intent-to-treat (ITT) basis with the last observation carried forward for mothers who did not complete the postintervention measures. As multiple t-tests were run, the significance level was adjusted to $p < .007$ to avoid a Type 1 error as per the Bonferroni calculation. Finally, multiple regression models were run on the delta scores for the outcome measures that were significant in the ITT analyses to determine whether differences in the location of interview had an impact on outcome scores.

Table 1. *Factor Analysis of Maternal Mood Scale*

Scale	Item (factor loading) Time 1	Item (factor loading) Time 2
Sadness/worry	Worrying (.77)	Tears running down face (.94)
	Tears running down face (.50)	Feeling sad (.71)
	Talking about problems all the time (.55)	Worrying (.58)
	Feeling sad (.41)	Thinking about things a lot (.70)
	Thinking about things a lot (.51)	Talking about problems all the time (.57)
	α = .66	α = .77
Irritability	Thoughts of killing self (.77)	Preferring to be alone (.84)
	Preferring to be alone (.69)	Don't like answering when others speak to you (.65)
	Prefer to sit silent (.59)	Easily annoyed (.59)
	Quarrel easily (.53)	Prefer to sit silent (.64)
	Easily annoyed (.48)	Quarrel easily (.67)
	Don't feel like speaking when others speak to you (.45)	Thoughts of killing self (.58)
	α = .64	α = .75
Somatic complaints	Feeling pain in some parts of the body (.74)	Feeling pain in some parts of the body (.81)
	Feeling weak (.72)	Feeling weak (.76)
	Unable to stay asleep for long (.44)	Unable to stay asleep for long (.64)
	α = .69	α = .70

Results

The population sizes of the overall community in which the research evaluation was conducted were K1: Kitgum Matidi, 14,594; K2: Padibe, 38,954; K3: Mucwini, 25,133; K4: Potiko, 11,975; K5: Agoro, 12,362. Demographic and study characteristics of the contrast and intervention groups are provided in Table 2. Mothers in the intervention group had more interviews at home than in other sites (e.g., health center) compared to the contrast group ($\chi^2 = 35.8$, $p < .01$). In addition, there was a significant difference between groups on the HOME play materials subscale ($t = -4.70$, $p < .01$), as mothers in the intervention group had more play materials available in the home than did mothers in the contrast group. There were no significant differences between completers and noncompleters on any of the demographic variables or maternal mood. However, mothers who were not followed up had more play materials available

($t = -3.03$, $p < .01$) and were more emotionally responsive than mothers who followed up ($t = -2.15$, $p < .05$). Given that there were significant preintervention differences for the play material and emotional responsivity subscales of the HOME and trend effects for some of the other outcomes, these variables were included in the multiple regression analyses as control variables.

Pre- and postintervention means and standard deviations for the intervention and contrast group and results from the intent to treat (ITT) analysis are presented in Table 3. ITT analyses on delta scores demonstrated that the intervention group had significant changes in maternal sadness/worry ($t = 2.95$; $p < .001$), maternal involvement ($t = -3.56$; $p < .001$), emotional responsiveness ($t = -4.25$; $p < .001$), and availability of play materials ($t = -4.19$; $p < .001$) from Time 1 (preintervention) to Time 2 (postintervention) in comparison to the contrast group. Mothers in the intervention group showed greater

Table 2. *Demographic Characteristics at Baseline (*t*-tests and chi-square)*

Characteristic	Intervention group (n = 132) mean (SD)	Contrast group (n = 105) mean (SD)	p value	T-test value or χ² value
Child age (months)	14.1 (6.6)	14.8 (7.9)	.52	$t = .65$
Mother age (years)	26.1 (6.4)	27.2 (8.1)	.28	$t = 1.09$
Marital status				
Married (%)	74.2	81.0	.22	$\chi^2 = 1.50$
Separated, divorced, or widowed (%)	25.8	9.0		
Number of children	3.5 (2.3)	3.3 (2.0)	.47	$t = -.72$
Mother years education				
No schooling (%)	34.8	44.8	.13	$\chi^2 = 4.11$
Lower primary (%)	18.9	21.9		
Upper primary, O level, and tertiary level (%)	46.2	33.3		
Years in the camp	4.4 (1.8)	4.0 (2.4)	.19	$t = 1.31$
Interview site				
Home (%)	26.9	74.7	.00	$\chi^2 = 35.8$
Other site (%)	73.1	25.3		

Table 3. *Means and Comparison of Mean Changes Between Groups: Intent-to-Treat*

Outcome measures	Contrast group (CG) Pre mean (SD)	Post mean (SD)	Intervention group (IG) Pre mean (SD)	Post mean (SD)	Mean change	t score	p value
Home subscales							
Maternal involvement	23.88 (2.69)	24.10 (3.03)	24.38 (2.65)	26.27 (2.24)	CG: 0.04 IG: 1.33	−3.56	$p < .001$
Play materials	8.35 (1.27)	8.38 (1.31)	9.28 (1.67)	10.73 (2.05)	CG: 0.07 IG: 0.99	−4.19	$p < .001$
Emotional responsivity	23.20 (2.29)	19.05 (3.36)	22.46 (2.77)	20.83 (4.05)	CG: −2.94 IG: −0.74	−4.25	$p < .001$
Acceptance	20.65 (1.01)	20.56 (0.93)	20.42 (1.05)	20.01 (1.70)	CG: −0.01 IG: −0.23	−1.29	$p = .197$
Maternal mood							
Sadness/worry	10.59 (3.65)	10.56 (3.98)	10.61 (3.55)	8.42 (2.95)	CG: −0.07 IG: −1.23	2.95	$p = .003$
Irritability	8.24 (2.69)	8.96 (3.30)	7.92 (2.49)	7.91 (2.29)	CG: 0.48 IG: 0.00	1.58	$p = .115$
Somatic complaints	6.99 (2.98)	7.30 (2.68)	6.30 (2.63)	6.10 (2.57)	CG: 0.32 IG: −0.12	1.33	$p = .185$

Note. CG = Contrast group, n = 105; IG = Intervention group, n = 132; Coding for group – intervention = 1 and contrast = 0.

involvement with their babies, more availability of play materials, greater emotional responsiveness, and less sadness/worry at follow-up in comparison to the contrast group.

Multiple regression analyses were run to examine the impact of the intervention while controlling for baseline scores on the outcome measures, as well as interview location at both time points, given that mothers in the intervention group had more interviews conducted at home. In terms of the models tested, interview location for both the preintervention evaluation and postevaluation, along with preintervention scores, was entered as the first step in a multiple regression with group entered as a second step to examine the impact of the intervention. Only outcomes significant in the ITT analyses were tested. Analyses were performed using SPSS statistical software. Results are presented in Table 4 and indicate that after controlling for interview site and preintervention scores, significant group effects remained for the play materials, maternal involvement, and the sadness/worry outcomes. Other observed results of the program were that nine intervention mothers initiated groups in their own localities to help neighboring mothers.

Discussion

This study suggests that a relatively brief group intervention can improve maternal involvement, increase the availability of play materials, and decrease sadness and worry in displaced mothers of malnourished children. It was acceptable to the mothers, easily taught, and showed evidence of being self-sustaining.

These improvements in maternal mood and maternal involvement are important. There is now a body of evidence linking low maternal mood (both clinical depression and depressive symptoms) with undernutrition and poor health outcomes in children in socially adverse environments (Patel, Rahman, Jacob, & Hughes, 2004; Rahman, Iqbal, Bunn, Lovel, & Harrington, 2004; Rahman, Patel, Maselko, & Kirkwood, 2008). One possible mechanism is that mothers with depressive symptoms are less engaged and involved with their children, play with them less, and are less responsive to their needs. The neglected baby becomes more apathetic and less able to engage the mother, setting up a downward spiral that leads to malnutrition and poor health.

Rahman and colleagues call for simple, low-cost psychosocial interventions that target both mother–child interaction and maternal mood (Rahman, Iqbal, et al., 2008; Rahman, Patel, et al., 2008). Our results suggest that a program to increase infant stimulation can also have a beneficial effect on maternal mood in keeping with Baker-Henningham's home visit program in Jamaica (Baker-Henningham et al., 2005). Interestingly this contrasts with both Rahman's home visit program using Learning through Play materials in Pakistan where knowledge of ECD improved, but maternal mood did not (Rahman, Iqbal, et al., 2008), and Cooper's home visit program in South Africa where both mother–child interaction and infant attachment improved, but there was only a limited improvement in mood (Cooper et al., 2009). One possibility is that the delivery of the intervention through a group format in which mothers were encouraged to share experience and praised in front of others for their achievements in relating to their babies increased mothers' feelings of competence and engagement with others and decreased feelings of isolation. This needs further investigation. This study looked at a multimodal psychosocial intervention and did not disentangle the effects of psychoeducation delivered through home visits and group work. Evaluating the effectiveness of each component independently would be an essential next step.

It is also notable that these improvements occurred after a short, easily administered group intervention. A 2007 review concluded that the most effective early child development programs are those that provide direct learning experiences for children and their families, are high intensity, targeted toward younger and more disadvantaged children, and are integrated with other health systems, such as nutrition or family support, and are of long duration (Engle et al., 2007). This intervention met all but the last criteria. The variance in the time of the t2 measurement actually suggests that these changes can occur for some mothers even after quite limited group attendance and a home visit. A study in Brazil has shown that changes in

Table 4. *Multiple Regression Predicting Outcome Measures Controlling for Location of the Interview: Per Protocol*

Characteristic	Statistic	Sadness/worry	Irritability	Maternal involvement	Play materials	Emotional responsivity
Step one						
Interview site preintervention	B	.50	−.24	.27	1.01	.36
	95 CI	−1.03 to 2.04	−1.46 to .99	−1.00 to 1.53	.31–1.89	−1.50 to 2.22
	p	.52	.70	.67	.01	.71
Interview site postintervention	B	.18	.21	−1.78	−1.28	−.94
	95 CI	−.98 to 1.33	.66	−2.72 to −.83	−1.86 to −.71	−2.35 to .47
	p	.76	−.72 to 1.12	.00	.00	.19
Time 1 scores	B	−.53	−.44	−.61	−.73	−1.15
	95 CI	−.67 to −.39	−.59 to −.29	−.75 to −.46	−.93 to −.54	−1.37 to −.87
	p	.00	.00	.00	.00	.00
Step two						
Group	B	−1.83	−1.12	1.46	2.30	1.36
	95 CI	−3.38 to −.33	−2.32 to .07	.23–2.69	1.53–3.06	−.48 to 3.20
	p	.02	.07	.02	.00	.15

Note. Contrast group, $n = 77$; intervention group, $n = 79$; Coding for group: intervention = 1 and contrast = 0.

maternal responsiveness could be achieved after one session watching a video and having a discussion (Wendland-Carro, Piccinini, & Millar, 1999.) This psychosocial intervention, which requires no technology or electric power to deliver, is more appropriate for mothers or caregivers and babies in mobile populations, where long duration is not possible. It suggests that doing a little is better than doing nothing.

Limitations

There are some serious limitations to this study that mean that the results can only be seen as suggestive and as providing indications for further research. These limitations relate to the difficulties of conducting research combined with service delivery in emergency settings. These need to be understood if the challenges of doing such work are to be met and will be discussed in more depth in a forthcoming article. The most significant constraints are security and donor funding priorities in emergencies. Donors working in these areas naturally prioritize service delivery addressing basic needs over research. If research is agreed, for logistic and ethical reasons, it is likely to be attached to some form of emergency program that will have a fixed, tight time line and limited staff and material resource (Allden et al., 2009). In addition, in these settings, the context is likely to change abruptly at any moment, and the research subjects who are participating out of goodwill alone may no longer be available.

In this particular case, the two main challenges were randomization and blinding. There was no randomization for the reasons given. Ideally, cluster site could have been added into the regression to control for possible interdependence between scores of the mothers in the different sites. Unfortunately, information on cluster site was not included on the data form, and it was not possible to obtain this information retrospectively. Thus, the potential impact of some unknown cluster level influence on mothers' scores cannot be ruled out. Blinding was limited by two major restraints: The research intervention and evaluation were conducted within the context of a time limited emergency feeding and capacity building program with a population already on the move. Secondly, limited funding did not allow for the hiring of a completely independent research evaluation team that could have been blind to study hypotheses and procedures. Thus, evaluators had to be selected from staff who would, after the evaluation was complete, continue to run the program and deliver the intervention. All staff thus attended the intervention training together. The data collectors were thus not blind to study hypotheses, intervention procedures, or the different geographical locations of the intervention and study groups. Very occasionally, as explained, they had to substitute for project staff. In addition, tests of observer reliability for the HOME scores were not conducted. Thus, there is a possibility of rater bias.

The sudden change in political circumstances meant that the original plan to measure postintervention outcomes (t2) at 4 months after admission to the nutrition program had to be modified. The data collectors were, on occasion, faced by mothers who planned to return home after two or three groups. Conversely, in some cases it took many weeks to find a mother who had completed the intervention and moved.

Thus, postintervention evaluations were done both earlier and later than planned on some mothers, resulting in a wide range for the t1–t2 interval. However, the fact that there was no significant relationship between the length of the interval between the two assessments and any of the outcomes suggests that the impact of the intervention was not limited to those mothers who completed the time 2 evaluation within a shorter time period.

A pertinent ethical concern was the issue of genuine informed consent. Data collectors faced some of the difficulties outlined by Allden et al. (2009). An unavoidable power imbalance may mean that consent is given because participants wrongly fear that services may be denied if they don't cooperate. Secondly, responses may be biased to the negative to present as needy a picture as possible. This may have biased initial responses on maternal mood. Great efforts were made to explain the purpose of the evaluation, its voluntary nature, the possibility of withdrawal at all times, and the fact that access to nutrition and the psychosocial support did not depend on participation.

A further limitation was that the limited time frame and resources only allowed for the study of immediate impact on infant stimulation and maternal mood. It was not possible in this case to measure the impact on child growth and cognitive development.

Conclusions

In summary, this study suggests that a low-cost intervention of 4–6 weeks consisting of attending mother and baby groups and receiving a home visit, conducted in connection with a community-based therapeutic feeding program run in internal displacement camps in a conflict affected area, may improve mothers' mood, their involvement with their children, and the availability of play materials. The study also demonstrated the severe limitations to the use of standard research procedures in humanitarian settings. These should be addressing if much needed research is to be carried out in these areas. Thought needs to be given to how to manage randomization, blinding, informed consent, and timelines for data collection (Allden et al., 2009; Leaning, 2001). The limitations described mean that additional validation of these findings is necessary before large-scale implementation.

This intervention may also be useful in other humanitarian contexts where low mood and lack of engagement are key issues, for example, with mothers who are rape survivors and have attachment difficulties with their babies or with carergivers in institutional settings. This evaluation should be seen as a preliminary step in a more extensive research program and as a feasibility study in exploring the difficulties and constraints of conducting research in humanitarian settings. Randomized controlled studies in humanitarian settings are needed to determine the most effective components of the intervention and the minimum time needed for an enduring change in behavior to occur. Ethical considerations of the needs in these settings mean that research should always be accompanied by service delivery and delivery of new services by proper evaluation. Thus donors should be encouraged to factor human, logistic, and time demands of such research into their budgets. Such evaluations should be combined with follow-up studies to measure the long-

term impacts on maternal mood, the child's physical growth and cognitive development, and the most effective methods for mother-to-mother dissemination of knowledge and practice over the long term. Research in humanitarian settings is feasible but raises ethical issues and requires particular forms of organization and donor support.

Keywords: infants; mothers; malnutrition; infant stimulation; maternal mood; mother–child interaction; nutrition intervention; Uganda

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