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Dry supplementary feeding programmes: an effective short-term strategy in food crisis situations

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Summary Malnutrition is frequently a predominant problem in disasters, and supplementary feeding programmes (SFPs) are often set up in food emergencies. This review analyses the effectiveness of such programmes in crisis situations in Liberia, Burundi and Goma (Congo), concluding that it is feasible to enrol large numbers of children in SFPs and achieve proportions of recovery above 75% if these programmes are implemented as a short-term measure in emergency situations. However, satisfactory SFP results do not necessarily indicate improved nutritional status of the whole population.

keywords dry supplementary feeding, emergency nutrition, outcome indicators, Goma, Liberia, Burundi

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Introduction

Supplementary feeding programmes (SFPs) were initially developed to provide immediate relief in food crisis situations. Their effectiveness in nonemergency settings has been questioned since the 1970s (Beaton & Ghassemi 1982; Fauveau *et al*. 1992; Barennes 1996), and in emergency situations, since the 1980s (Godfrey 1986; Shoham 1994; Curdy 1995; Editors 1997). However, few discharge outcome indicators of SFPs in emergency settings have been documented (Simmonds & Brown 1979; Barnabas *et al*. 1982; Gibb 1986; Godfrey 1986; Quillet 1994). This paper evaluates the discharge outcomes of three SFPs implemented during a food crisis involving a total of 40 223 children. The programmes, distributing a dry take-home ration, were managed by the nongovernmental organization Médecins Sans Frontières in two rural contexts – Liberia and Burundi – and in refugee camps in Goma (Congo) or (RDC).

Population and methods

Population

In Liberia long-term civil war resulted in economical and agricultural collapse. A nutritional survey conducted in October 1993 in a neighbouring region showed an acute malnutrition rate of 40% in all areas (MSF-Holland 1993). The acute malnutrition rate was defined as weight/height < -2 Z-scores or oedema (NCHS,CDC,WHO Reference Table 1982). The SFP covered Nimba, a part of Bong and Grand Bassa counties for a total population of 350 000–400 000.

Burundi refugees who fled to Tanzania after the massacres in October 1993 returned to Burundi at the beginning of 1994. Food shortage was expected to persist until the next harvest. A nutritional survey conducted in February 1994 revealed an acute malnutrition rate of 10.4% in all areas and an acute severe malnutrition rate of 2.2% (MSF-Belgium 1994a). The acute severe malnutrition rate was defined as weight/height < -3 Z-scores or oedema (NCHS,CDC, WHO Reference Table 1982). An SFP covered the five provinces of Karusi, Ruyigy, Rutana, Ngozi and Kayanza for an estimated population of 1.4 million.

Around 800 000 Rwandan refugees arrived in Goma in Kivu during July 1994. The satisfactory nutritional status of this population declined rapidly due to the immediate onset of cholera and shigellosis outbreaks resulting from insufficient water supply. An SFP covered the camps of Kibumba and Kahindo with a total population estimated at 200 000–300 000. The population was dependent on general food distributions. A nutritional survey conducted in August 1994 showed an acute malnutrition rate of 20.2% in all areas

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Table 1 Programme characteristics

	Liberia	Burundi	Goma
Number of centres	12–16	47	7
Feeding sessions per week	50–65	50–60	42
Medical care	Primary health care in SFC	Referral to dispensary	Primary health care in SFC
Number of staff	135–180	70–90	85–115
Staff remuneration	Food for work (rice)	Salary	Salary
Weekly food ration			
Corn Soya Blend	2100 g	1600 g	1400 g
Oil	200 g	200 g	200 g
Sugar	200 g	200 g	100 g
Milled biscuit	0	0	700 g
Total	2500 g	2000 g	2400 g
Content of the daily ration			
kcal/child/day	1511	1239	1524
g proteins/child/day	54	41	54
% of kcal as protein	14	13	14
g of fat/child/day	46	42	40
% of kcal as fat	27	30	24

and an acute severe malnutrition rate of 3.0% (MSF-Belgium 1994c). The crude mortality rate at the start of the SFP was between 4 and 6/10000/day according to mortality figures reported by the United Nations High Commissioner for Refugees.

The populations in these three countries suffered from acute food shortages, and large-scale dry take-home SFPs were implemented for 6–8 months. The objectives of these programmes were to 'fill the gap' until domestic food supply was ensured; to cure moderately malnourished individuals; to prevent severe malnutrition and to subsequently reduce the mortality risk. Dry rations were composed of a cereal mix, corn soya blend (CSB), oil and sugar (Table 1). Registered children came once a week for weight and medical monitoring and received a weekly ration. Additional supportive family rations were distributed in Liberia (5 kg of CSB or 1.5 kg of rice) and in Burundi (2 kg of maize, beans or CSB) to families with malnourished children. There was no adequate general food distribution in either of these two areas.

In total, 70 Supplementary Feeding Centres (SFCs) were opened, located either in existing health facilities (Burundi), separate buildings (Goma), or both (Liberia). In Goma and Liberia, one nutritional team was assigned per SFC, each being responsible for 3–6 sessions per week (a centre with 150 children/day could register 900 children if open 6 days/week). In Burundi the programme was managed by one or two mobile teams per province visiting each centre once or twice a week. Measles vaccinations were carried out regularly in all three programmes. The number of centres, feeding sessions, staff allocation and medical care are given in Table 1.

Methods

The enrolment criterion was a weight for height index (w/h) $\leq$ 80% of the median (NCHS,CDC,WHO Reference Table 1982). As age data were unreliable, height was used: $\leq$130 cm in Liberia and Goma and $\leq$110 cm in Burundi. The admission policy for children with oedema varied. In Goma, all children with oedema were referred to therapeutic feeding centres (TFCs). In Liberia, children with slight oedema but good clinical status were admitted to SFCs. Referral to a TFC was a burden for families and many children with slight oedema and acceptable clinical state responded well to treatment in SFCs. In Burundi, the majority of children with oedema were admitted to SFCs at the beginning of the programme. Later on, as TFC capacity increased, most children with oedema were admitted to TFCs. Data regarding the number of admissions and exits were collected weekly for each feeding centre. The outcome indicators at exit were calculated as a proportion of the total number of exits: recovery, defaulter, death and transfer. Transfer indicated referral to either the hospital or to the TFC; in Goma, there were transfers from camp to camp. The recovery criterion was similar in the 3 programmes: $>$ 85% w/h without oedema for 2 consecutive weeks. Defaulters were children who had not attended the SFP for 3 consecutive weeks in Burundi and Goma and 2 consecutive weeks in Liberia.

The coverage of the programmes was estimated from the number of potential beneficiaries, extrapolated from surveys, and the number of beneficiaries attending the SFP at the end of a month. The average length of stay, in days, for recovered

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Table 2 Supplementary food programme outcome indicators

	Liberia		Burundi		Goma		Total	
	No.	%	No.	%	No.	%	No.	%
Recovered	9966	81.3	6147	66.8	14823	79.0	30936	76.9
Defaulters	1923	15.7	2682	29.2	2139	11.4	6744	16.8
Deaths	50	0.4	63	0.7	33	0.2	146	0.4
Transfers	320	2.6	305	3.3	1332	7.1	1957	4.9
Transfer between camps					440	2.3	440	1.1
Total exits	12259		9197		18767		40223	

Table 3 Comparison of the SFP outcome indicators between five provinces in Burundi

	Karusi		Ruyigi		Rutana		Ngozi		Kayanza	
	No.	%	No.	%	No.	%	No.	%	No.	%
Recovered	1617	68.8	1042	57.6	678	61.5	2364	69.5	446	83.1
Defaulters	611	26.0	735	40.7	342	31	925	27.2	69	12.8
Deaths	15	0.6	7	0.4	3	0.3	30	0.9	8	1.5
Transfers	108	4.6	24	1.3	79	7.2	80	2.4	14	2.6
Total	2351		1808		1102		3399		537	

children was systematically calculated for all centres in Liberia and Goma; in Burundi, this was calculated in selected SFCs. The study covered the entire duration of the programme in Goma from August 1994 to February 1995. In Burundi, it covered the period March to September 1994 until the hand-over of the programme to the ministry of health or other private organizations. In Liberia it covered the time from September 1993 to May 94.

A total of 53 140 children were admitted during this period: 18 978 in Liberia, 14 673 in Burundi and 19 489 in Goma. Of these, 10 337 (19.4%) are not included in the results because they were still attending a centre at the end of the period analysed (4905 in Liberia and 5432 in Burundi). In all, 42 803 children exited from the SFP: 14 073 in Liberia, 9241 in Burundi and 19 489 in Goma. Of these, 2580 (6%) were excluded from the analysis: 1814 were lost to follow-up in Liberia as three SFCs were looted; 273 reported figures were unreliable and 493 admissions in Goma did not fit the admission criteria.

Results

The results are given in Table 2. In Liberia and Goma the average length of stay before recovery was 50 days; in Burundi the average length of stay was 70 days. In all three programmes the proportion of deaths was $< 1\%$ of the total number of exits. These figures may be underestimated in the rural areas of Burundi and Liberia, where tracing of defaulters was difficult. The breakdown of figures for the five provinces in Burundi revealed large differences, as shown in Table 3.

Coverage of the SFPs was estimated at 93.7% in Goma (Kibumba) at the end of September 1994, based on the nutritional survey of August 1994 (MSF-Belgium 1994c). Coverage in Liberia (Nimba) was estimated at 69.9% when all feeding centres were open in January 1994 and based on the nutritional survey figures of December 1993 (MSF-Belgium 1993). It was estimated at 29.6% at the end of April 1994 in Burundi (Ruyigy) based on the nutritional survey of February 1994 (MSF-Belgium 1994a).

Discussion

The lack of formal evaluations of SFPs in refugee populations has been highlighted by Godfrey (1986) in a review of programme results using different outcome measurements. In Ethiopian refugees in Sudan Barnabas *et al*. (1982) reported a weight gain in 54% of children enrolled SFPs in 1981; Gibb (1986) found a weight gain between 23% and 84% in 1985; Simmonds & Brown (1979) observed among Zairian refugees in Angola in 1978 that 42.9% of the beneficiaries of SFCs improved their weight for height percentage. In Somali

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refugee camps in Kenya in 1992 Quillet (1994) found in wet on-site SFCs proportions of 58.8% recovery, 38.1% failures and 3.1% transfers.

Targets for outcome indicators have been proposed by Médecins Sans Frontières based on years of experience in SFP management (MSF 1995). The target for recovery is $> 70\%$ and $< 15\%$ for defaults. The results of Liberia and Goma showed a proportion of recovery above this value, but in Burundi the 66.8% proportion of recovery was slightly below the objective. The proportion of defaulters was acceptable in Goma (11.4%), borderline in Liberia (15.7%) and unacceptable in Burundi (29.9%) More defaulters were expected in rural areas where their tracing was more difficult than in a camp. But their high proportion in Burundi cannot be due only to this factor.

In the literature, the coverage of SFPs in refugee camps is reported to range from 34% to 100% (Seaman 1972; Barnabas *et al*. 1982; Gunn *et al*. 1983; Taylor 1983; Gibb 1986; Quillet 1994). Gibb (1986) noted in Ethiopian refugee camps that the coverage of dry ration SFCs was higher ($> 90\%$) than of wet on-site SFCs. In this study, the coverage of the SFPs in the camps of Goma exceeded 90%. This was better than the coverage found in the rural areas, 70% in Liberia and $< 30\%$ in Burundi. However, coverage figures of the three programme areas should be read with caution because population figures were inaccurate in Burundi and Liberia; different anthropometric indices were used in surveys (z-scores) and as inclusion criteria for SFPs (% of the median); different height inclusion criteria were used for enrolment (130 cm) in SFCs and in surveys (110 cm); and the time lapse between the survey and the programme implementation. It was surprising to discover such significant differences in results between Burundi and Liberia, where contexts appear more comparable with rural populations. Several factors could explain differences between Burundi and both Liberia and Goma.

Accessibility and acceptability

Variables such as coverage and proportion of defaulters are proxy indicators for the acceptability and accessibility of SFPs. They are influenced by factors such as distance, food acceptability, level of security in the area and distrust of the potential beneficiaries. The distance to the feeding centres cannot explain the difference between Burundi and Liberia: distances were longer and transport problems worse in Liberia than in Burundi.

The child's ration was appreciated in all three programmes. In both Liberia and Burundi, supportive family rations were distributed. The rice given out in Liberia was highly welcomed by families, whereas in Burundi this was less so. All three areas were insecure. In Burundi and Liberia walking to the centres was risky for the beneficiaries. In such situations, people carefully balance the need for food and possible risks encountered.

In Burundi the nature of the conflict generated distrust between population and health personnel in several provinces including Karusi and Ruyigy. This might explain the difference compared to Liberia, where the SFC staff was well integrated to the community. The worst results were found in those Burundi provinces that were subject to large population movements and the closing of many health structures due to departure of qualified health staff. The choice of mobile teams in Burundi may also have influenced the degree of trust between staff and beneficiaries as the workers were not known by the population. However, the extent to which these different factors influenced programme attendance is difficult to measure.

Quality of the services

Variables such as the proportion of recoveries, deaths and transfers, and average length of stay mainly reflect the quality of services provided by the SFPs. The quality is affected by factors such as diet, medical care, referral system and organization of the centre. The rations distributed in the three programmes were above the 700–1000 kcal/day recommended by WHO/AFRO (1996). Between 24% and 30% of the energy were provided by fat, which was below the recommended level of 35%–55% (Briend 1995); the proportion of fat was highest in Burundi (30%). Between 13% and 14% of the energy were provided by protein, which corresponds to the recommended 12% (Golden *et al*. 1995). There was no addition of minerals and vitamins to the rations.

The average length of stay of 50 days in Goma and Liberia was acceptable but 70 days in Burundi was too long. This could be related to the provision of basic medical treatments within the SFCs in Goma and Liberia, but referral in Burundi. A high proportion of deaths (1.6%–4%) was reported in Burundi during the first three months of the programme due to the lack of TFC to care for severe cases in the provinces of Karusi and Ruyigi.

In Goma and in Burundi, the average number of children attending an SFC was 138 and 132 per day, respectively, whereas in Liberia it was only 78. These figures do not suggest an overload on the resources of the SFCs. There was large variation between centres in Burundi with a range from 13 to 300 children per day. The quality of care will suffer in an overloaded centre where the waiting time is long, the environment noisy and where deficient medical attention and bad working conditions prevail. However, other factors should be taken in consideration, as the most overcrowded centres did not obtain the worst results.

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The results in Goma and Liberia indicated adequate quality, level of accessibility and acceptability of the SFP. Satisfying SFP outcomes are indicators of programme function but give no information on the nutritional status of the population: in Liberia the number of monthly admissions did not decrease despite good SFP results. The prevalence of acute malnutrition in all areas did not improve significantly from 9.6% in December 1993 (MSF-Belgium 1993) to 7.3% in June 1994, and the mortality rate remained high at 1.1/10 000/day in June 94 (MSF-Belgium 1994b). The ongoing war caused food shortages without adequate general food distributions. In Goma, however, between August and December 1994 the prevalence of acute global malnutrition decreased from 20% (MSF-Belgium 1994c) to 2% (MSF-Belgium 1994d) and the mortality rate dropped from 5/10 000/day to < 1/10 000/day. General food distributions took place regularly.

The choice between dry take-home rations and wet on-site rations is the subject of an old debate, and the advantages and disadvantages of each type have been documented by Godfrey (1986) and Shoham (1994). There is a consensus that dry rations should be the first choice except in special situations. However, in a review of SFP in emergencies Shoham (1994) found that the majority of SFPs were still designed for wet feeding.

The results of this study support the view that dry food is an appropriate form of ration and that implementation of SFPs with dry rations can rapidly cure a large number of malnourished children in camp as well as rural populations. Appropriate medical care in SFPs and trust between beneficiaries and SFP staff both seem to positively influence outcome indicators.

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