

# The impact of a short-term intervention using the WHO guidelines for the management of severe malnutrition at a rural facility in Angola

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## ABSTRACT

**Objective** To measure the impact of practice review and in-service supervision based on WHO guidelines on outcomes of severely malnourished children in a rural facility with minimal resources staffed only by nurses.

**Design** Intervention (January to August 2006) with historical comparison of outcomes (January to August 2005).

**Setting** Therapeutic feeding centre in rural Angola.

**Patients** All children admitted to the feeding centre during the study period.

**Intervention** Médecins Du Monde implemented an intervention that consisted of weekly physician supervision of staff activities and establishment of a study group composed of nurses in the centre.

**Main outcome measures** Routine practices in the centre and measured indicators for outcomes of admitted children, which were compared to indicators before the intervention.

**Results** During the intervention the authors observed improved delivery of important tasks such as frequent feeding and avoidance of intravenous rehydration. Among the 379 children admitted during the intervention, compared to the 358 children admitted previously, successful treatment increased from 73.2% to 82.6% (RR 1.13; 95% CI 1.04 to 1.22) and fatalities decreased from 15.6% to 8.7% (RR 0.56; 95% CI 0.37 to 0.83).

**Conclusion** This short-term intervention with in-service supervision based on the WHO guidelines in a setting of limited resources apparently contributed to a reduction in fatality rates. These findings support the view that such guidelines can be effectively implemented in under-resourced facilities in Angola and similar settings if they are introduced using an interactive approach and if in-service supervision continues to be provided.

## INTRODUCTION

In spite of important advances in prevention and treatment, malnutrition continues to be a worldwide problem. Internationally, 55 million children under the age of five are estimated to be wasted, of whom 19 million (35%) are severely wasted or severely malnourished.<sup>1</sup> In Angola, an estimated 30% of children under the age of five are wasted<sup>2</sup> (the fraction having severe malnutrition being unknown), under five mortality is one of the highest in the world (158/1000), and nearly one third of child deaths are attributable to undernutrition.<sup>3</sup>

Inappropriate case management of severe malnutrition is believed to be one of the main reasons why high case fatality rates (20–30%) persist worldwide.<sup>4</sup> In 1999, the WHO developed

## What is already known on this topic

- ▶ Inappropriate case management of severe malnutrition is one of the main causes of high case fatality rates worldwide.
- ▶ Previous studies suggest that management of severe malnutrition according to the WHO guidelines can reduce case fatality rates by up to 55%.
- ▶ Training alone is insufficient to sustain changes that have improved child care.

## What this study adds

- ▶ An intervention based on WHO guidelines in a resource-poor setting resulted in a 44% decrease in fatalities.
- ▶ Continued in-service supervision and a participatory approach were important aspects of the intervention.
- ▶ WHO guidelines for severe malnutrition can be effectively implemented in under-resourced settings if introduced in an interactive way and with supervision.

guidelines for the management of severe malnutrition, aiming to improve inpatient treatment.<sup>5</sup> Wider use of these guidelines through in-service training is thus considered key for improved case management and decreased case fatality.<sup>6</sup>

The use of the WHO guidelines and their impact on outcomes related to severe malnutrition have been investigated in diverse settings such as South Africa, Bangladesh, Brazil and Colombia. These studies, which report interventions with before and after comparisons,<sup>7–13</sup> suggest that management of severe malnutrition according to the WHO guidelines can reduce case fatality rates by up to 55%.<sup>1</sup> The successful implementation of protocols, however, has been linked to the presence of skilled staff and appropriate resources,<sup>14</sup> the WHO guidelines having been written for use by physicians and other senior health workers.<sup>5</sup> Nevertheless, in many African countries such as Angola, rural facilities, including therapeutic feeding centres, are rarely staffed by qualified

personnel. Lack of medication, delays in staff remuneration and precarious infrastructure are also very common. Few studies have been conducted in such settings, where conditions are far from ideal for managing a feeding centre. In addition, no data exist concerning the management of severe malnutrition in Angola. Thus, the objective of this study was to measure the impact of practice review and in-service supervision based on WHO guidelines on the outcomes of severely malnourished children admitted to a therapeutic feeding centre in Bailundo, a rural municipality in Angola.

## METHODS

This intervention was part of a larger project run in Angola by the non-governmental organisation Médecins Du Monde – France (MDM-F), aimed at improving maternal and child health, especially through the training and supervision of local staff. It was conducted in the rural municipality of Bailundo (with approximately 280 000 inhabitants), in the north of the province of Huambo, one of the areas severely affected by the prolonged civil war which only ended in 2002. The Bailundo therapeutic feeding centre, originally set up by the organisation Médecins Sans Frontières during the war, consists of a separate ward for severely malnourished children only, within the municipal hospital (figure 1). This centre, with a capacity for approximately 20 children with severe malnutrition and their mothers, operated under very poor conditions: there were too few beds and bednets, there was no lighting, air conditioning or heating, and provision for mothers and other caregivers was inadequate. Moreover, medication and supplies were often insufficient, running water absent and wash basins limited. As soap was also scarce, it was primarily distributed to children with skin infections. In spite of its limited capacity and infrastructure, each month the centre admitted approximately 45 children aged 0–12 years with a diagnosis of severe malnutrition (weight-for-height Z score of less than  $-3\%$  or  $<70\%$  of *National Center for Health Statistics* (NCHS) reference median and/or associated oedema). Usually, the number of children under treatment at the centre at any given time varied between 20 and 35, and the mean length of stay was 20 days. Other children of the caregiver (usually the mother) looking after the malnourished child often shared the same bed on the ward, compounding the problems.



**Figure 1** Children and their caregivers in the therapeutic feeding centre in Bailundo.

The centre's staff consisted of 14 basic level nurses (2 years of mid-level general nursing training) and four medium level nurses (4 years of mid-level general nursing training). There were no senior nurses or physicians in the centre; the only physician in Bailundo was in charge of the entire hospital facility, caring for over 80 patients at a time. As he additionally had several administrative duties, he was rarely available to supervise the staff in the feeding centre. The nurses had been trained in the management of severe malnutrition in 2003, but had not been supervised since then. Nurses who started working at the centre after 2003 had received no training at all. The lack of motivation, low morale and poor team functioning were striking.

From January to August 2006, MDM-F developed and implemented a programme of in-service supervision of the health team in charge of the management of children admitted with severe malnutrition at this centre. During this time, one expatriate physician was present for approximately 8 h/week: 4–6 h for supervision and 2–3 h for group study activities. The programme was based on the Portuguese review of the WHO guidelines<sup>15</sup> as recommended by the Angolan Ministry of Health. Initially, a 1-day workshop on basic concepts of malnutrition was offered to all hospital nursing staff with the intention of promoting general awareness of the problem, its correct identification and referral of severe cases to the therapeutic feeding centre. Then, once weekly supervision of the feeding centre staff by the MDM-F physician, a general practitioner, was instituted and directed towards the review of daily practices at the centre. In these supervision sessions, which were intended to be interactive and educational, the staff raised their questions and problems for discussion. Simultaneously, at the proposal of the medium level nurses, a weekly study group was formed to review the WHO guidelines in parallel with the in-service supervision. The study group reviewed the main topics of WHO guidelines: assessment of a malnourished child, initial treatment (preventing/treating hypoglycaemia, hypothermia, dehydration, electrolyte imbalance, infection and micronutrient deficiency, and instituting an appropriate diet), rehabilitation, and follow-up and management of treatment failures. The staff in the centre were free to ask the MDM-F physician for advice at any time, as an open and participatory approach was taken.

During this period, we observed the routine practices of the staff. Data on successful treatment (weight-for-height Z score of more than  $-2$  or  $\geq 80\%$  of NCHS reference median), withdrawals (left the centre before successful treatment), discharges without progress (criteria for successful treatment not met), transfers (to other wards or facilities) and deaths (died in the centre, not in any other of the hospital's wards, died during admission) were extracted from records routinely compiled on a monthly basis by the centre's supervisor (one of the medium level nurses) for the centre's register. Data entry was performed by the four medium level nurses under the supervision of the MDM-F physician using Microsoft Office Excel (2003). Indicators during the intervention were then compared to those from a similar period (January to August, 2005) before the development of the programme, statistical analyses being performed with Epi-info v 3.4.3 using  $\chi^2$  tests, with calculation of relative risks and 95% CI. All tests were two-tailed and the level of significance was set at 0.05.

All the activities developed in the context of this study received ethics approval from the State Health Department of the Province of Huambo, Angola.

**Table 1** Comparison of selected variables in the Bailundo therapeutic feeding centre before and during a short-term intervention with in-service supervision and review of WHO guidelines

Children's characteristics and outcomes	Period		RR (95% CI)
	Prior to intervention (January to August 2005) (N=358)	During intervention (January to August 2006) (N=379)	
	n (%)	n (%)	
Percentage with oedema on admission	183 (53.2)	222 (57.1)	1.07 (0.94 to 1.22)
Successful treatment	262 (73.2)	313 (82.6)	1.13 (1.04 to 1.22)
Withdrawal	28 (7.8)	22 (5.8)	0.74 (0.43 to 1.27)
Death	56 (15.6)	33 (8.7)	0.56 (0.37 to 0.83)
Discharge without progress	3 (0.8)	0 (0)	0.16 (0.01 to 3.13)*
Transfer to another ward	9 (2.5)	11 (2.9)	1.15 (0.48 to 2.75)

\*The test was performed summing 0.5 to the frequency of the cell "Discharge without progress" in the intervention period to enable relative risk estimation.

## RESULTS

Concerning team practices, we observed, in qualitative terms, improved delivery of important tasks during the intervention period, with better adherence to feeding at the designated times, more attention given to keeping children warm, more insistence on oral rehydration instead of indiscriminate use of intravenous rehydration, and more rational use of antibiotics. After programme implementation, we identified greater motivation and improved morale among health centre staff, with team work being better organised and medium level nurses having a more pronounced and positive leadership role. We noted higher awareness among staff in identifying ways to provide better care. We also noted positive changes in staff attitudes towards children and their caregivers, with nurses being more understanding and giving more attention to caregiver concerns.

Regarding the characteristics of admitted children (table 1), the proportions presenting with oedema at admission before (53.2%) and during (57.1%) the intervention were similar (RR 1.07; 95% CI 0.94 to 1.22). In terms of outcomes (table 1), comparing those of 358 children admitted prior to the intervention with the 379 children admitted during the intervention period, successful treatment rates increased by 13% (from 73.2% to 82.6%, RR 1.13; 95% CI 1.04 to 1.22) and fatality rates declined by 44% (from 15.6% to 8.7%, RR 0.56; 95% CI 0.37 to 0.83), with an estimated 26 ( $379 \times (0.156 - 0.087)$ ) deaths being prevented during the intervention period. Withdrawal rates decreased by 26%, although this decline was not statistically significant (95% CI 0.43 to 1.27). The number of children transferred to another ward or facility did not differ between the two periods (RR 1.15; 95% CI 0.48 to 2.75), nor did the number of children discharged without progress differ (RR 0.16; 95% CI 0.01 to 3.13).

## DISCUSSION

During a multifaceted short-term intervention based on WHO guidelines for the management of severe malnutrition, with limited supervision of nursing staff in a rural feeding centre, we observed a 13% increase in successful treatment and a 44% decrease in fatalities.

Despite the fact that our study was not a randomised controlled trial, which would have allowed us to draw more definite conclusions, we believe these benefits are due to the observed improvement in team practice regarding the routine management of severely malnourished children at the centre. As no new technologies were implemented, we believe that improved delivery of simple and important tasks, such as

rigorously following feeding hours and avoiding intravenous rehydration, were paramount in changing the measured outcomes. Before the intervention, feeding hours, especially at night, were not strictly adhered to, apparently because the staff were not sufficiently convinced of the importance of adherence for children's survival. In addition, intravenous administration of fluids and medication was often the first route of choice, apparently because of a lack of understanding that intravenous administration can be dangerous and even fatal for severely malnourished children, who have a very limited tolerance for fluid intake, and because identification of severe dehydration in a severely malnourished child can be quite difficult. Further, routine antibiotic coverage was not understood to be a necessary practice. Therefore, if the first choice antibiotic was unavailable, the child would often be left without any coverage. During the intervention, we worked on establishing the protocol for antibiotic coverage, with first, second and third choices, according to availability, emphasising the importance of not leaving children uncovered. Another important point highlighted during the intervention was tuberculosis investigation in all children who did not improve as expected with routine management of severe malnutrition. Tuberculosis treatment was available at the Bailundo hospital for affected children, with two small isolation rooms being reserved for such cases.

The group study of the guidelines may have strengthened the effect of supervising in-service activities. Moreover, the programme's participatory approach (the study group was requested by the centre's nurses, while data entry was performed together with them), as well as the continued presence of the MDM-F physician who carried out the supervision, seem to have improved motivation and to have stimulated staff reflection and critical thinking about how their own practices and other factors might be influencing health outcomes. Moreover, we believe that if supplies had been available regularly, if there had been running water, if the ward had air conditioning and heating, and was brighter and less humid, and if proper beds with bednets were available for each admitted child with better conditions (space, availability of food) for their caregivers, case fatality rates might have been reduced even further.

The intervention used in this programme can be described as multifaceted, since it used a variety of individual interventions to improve work processes: in-service supervision sessions, group study, group data management and open discussions about a variety of themes raised by the nurses. This allowed comprehensive and personalised intervention, as it

was based, through the study group approach, on increasing the knowledge, competence and enthusiasm of staff as it progressed.

According to the literature, implementation of WHO guidelines, even without the continued presence of qualified personnel, is possible, but short training workshops are insufficient.<sup>9</sup> In addition, successful training programmes and interventions may not be sustainable without the effective support of senior managers committed to creating positive organisational structures and a motivational environment.<sup>16</sup> The experiences described in the literature emphasise the importance of continuous supervision, especially for workers who have only been trained for a limited period of time. Our study was based on the presence of an external supervisor. However, the strategy of a local supervisor working within the country's health system is a feasible alternative which would facilitate part-time but continuous supervision of the routine management of severe malnutrition. We believe weekly attendance in malnutrition wards of a trained local health worker to supervise staff, working on managing severe malnutrition as systematically presented in the WHO guidelines, is feasible. This person should concentrate on work processes, stimulating staff participation in training and supervision activities, while working to develop leadership, team work, cooperation, and, most importantly, motivation. Finally, this supervisor should in particular be open to the specific demands of each staff and each ward, achieving greater effectiveness through personalising the approach to any given situation.

Several previous studies have shown a reduction in fatality rates with the use of WHO guidelines for the management of severe malnutrition.<sup>7 8 10 11 13</sup> The findings of our study thus confirm previous results in under-resourced settings. However, our study differs from most if not all previous reports in that the Bailundo therapeutic feeding centre had no university trained nurses or permanent physicians, and resources in terms of infrastructure and supplies were constantly lacking, even though MDM-F usually provided small amounts of essential medicines for the centre. Most of the studies previously cited had physicians in the teams implementing the WHO guidelines. Additionally, to our knowledge, no previous data have been published on the management of severe malnutrition in Angola.

Fatality rates in the period prior to intervention in this study were lower than those of other studies, which reported rates of 20%,<sup>7</sup> 33.8%<sup>11</sup> and 48%.<sup>8</sup> One possible explanation is that children with additional complications, and thus a worse prognosis, were usually managed in a different ward in the Bailundo hospital. For example, mortality was as high as 34% on the hospital's paediatric ward, where some severely malnourished children admitted for other diagnoses were managed. According to WHO parameters for the care of patients with severe malnutrition, the successful treatment rate attained in the intervention period was satisfactory at 82.6%, which is higher than the suggested 80% cut-point. However, the observed fatality rate was still higher than desired at 8.7%, which is above the suggested 5% cut-point.<sup>5</sup>

Recently, there has been major discussion on the merits of community versus traditional hospital-based therapeutic care. In the community care approach, all children with severe malnutrition without complications are treated as outpatients.<sup>17</sup> This approach, currently showing positive results with reduced fatality rates and lower costs,<sup>14 18</sup> emphasises the benefit of community involvement in the prevention

and treatment of malnutrition. However, in Angola, until the healthcare system and especially primary healthcare are strengthened, in-hospital treatment probably remains the best option for the management of severely malnourished children. Although implementation of guidelines must proceed concurrently with substantial improvement in the health system overall, our study suggests that appropriately trained middle level staff can, if effectively and continuously supervised, provide adequate in-hospital care for most cases of severe malnutrition until more highly skilled workers are trained. Finally, one should be very cautious in extrapolating the findings of this study to non-hospital settings, as this was not the context of our intervention. Nevertheless, we believe that continuity in training and supervision, and a participatory approach are fundamental in any setting.

The main limitations of our study are that it was not a randomised controlled trial, which would have permitted more robust conclusions, and it had a short duration of follow-up, which raises questions about the sustainability of the results once external support was withdrawn. However, the centre coordinator assumed a very important leadership role during our intervention and we believe that the creation of such local leadership is very important in maintaining long-term benefit following such an intervention. Another limitation of our study is the fact that data were collected from the centre's routine register before and during the intervention, which may have limited the quality and quantity of the data collected. We had no recorded covariates allowing multivariable analysis to be undertaken to control for potential confounders. Additionally, the fact that only one unit was studied raises inevitable questions regarding the generalisability of the results.

Nonetheless, we have demonstrated that this intervention with in-service supervision and review of practice using the WHO guidelines for the management of severe malnutrition, was associated with improved outcomes, apparently contributing to the observed reduction in fatality rates despite limited physician input, an absence of highly trained nurses, poor infrastructure and lack of supplies. The participatory approach used in this programme appeared to be key to improving motivation and encouraging the assumption of responsibility, which in turn enabled changes in service practices and encouraged staff autonomy. Our findings support the suggestion that the WHO guidelines can be effectively implemented in under-resourced facilities in Angola and similar settings if they are introduced in an interactive manner and if minimal continued in-service supervision is provided.

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**Competing interests** None.

**Ethics approval** This study was conducted with the approval of the State Health Department of the Province of Huambo.

**Provenance and peer review** Not commissioned; externally peer reviewed.

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