

## **Community based nutritional rehabilitation of severely malnourished children**

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### **Abstract**

**Objective:** To improve nutrition of malnourished children in the community, using home based treatment.

**Methods:** A prospective cohort study was conducted in a squatter settlement of Karachi (Khuda Ki Basti). The study was conducted from August 2006 to March 2007. All children < 5 years who were <-3sd weight for height were included as per WHO guidelines. After initial screening for complications, the children were provided with high density diet (HDD). Daily weight, amount of HDD consumed and complications were recorded.

**Results:** A total of 24 children were included in the study. Eleven children (45.8%) reached - 1SD at the end of 3 months while 10 patients (41.6%) took 4 months. Twenty two patients (91.6%) were at the median weight for height by the end of 5 months.

**Conclusion:** Home based treatment with locally available foods can be used successfully to rehabilitate severely malnourished children (JPMA 60:179; 2010).

### **Introduction**

Malnutrition is associated with more than 50% of all childhood mortality under 5 years of age in developing countries.<sup>1</sup> Globally it affects 13 million children under 5 years of age and is associated with 1-2 million preventable deaths each year. The last two decades have not seen much change in the situation in Pakistan as far as the number of children with wasting and stunting is concerned. Presently in Pakistan 38% of all children under 5 years are underweight, out of these 13.9% are moderately severely wasted.<sup>2</sup>

WHO has formulated guidelines for the management of severely malnourished children in the hospitals.<sup>3</sup> This has shown to reduce the fatality rates,<sup>4</sup> but inpatient care is associated with a high economic burden for the government as well as the affected families. Institutional cost of inpatient treatment was 5.3 times greater than home care in urban Bangladesh.<sup>5</sup> In addition, to this inpatient care requires the services of a highly motivated staff to achieve better care and outcome of severely malnourished children.<sup>6</sup> Discharge criteria for severely malnourished children according to the WHO guidelines include weight for height <-1SD. This entails a long hospital stay of at least 6 weeks which adds to the cost and in most cases is unacceptable to the families. Moreover prolonged hospital stay increases the risk of infection.<sup>7</sup>

A solution to the problem which is both successful and cost effective is community based rehabilitation.<sup>8</sup> This allows a wider coverage to a majority of children by engaging and mobilizing the community. This approach is also effective with decreased chances of cross infections.<sup>9</sup> Compliance, which is a major confounder in successful rehabilitation in the

hospital is better with home care and fewer dropout rates.<sup>10</sup> There are no reported studies in Pakistan to demonstrate the effectiveness of local home based techniques to improve the nutrition of malnourished children.

Health Education and Literacy Programs (H.E.L.P.) is an N.G.O. which has experience of working in squatter settlements. Khuda ki Basti is one such settlement located in the outskirts of Karachi with a population of approximately 10,000. Majority of the population is below the poverty line. The survey done of its inhabitants revealed that the total number of children under 5 years was 1733. Seven percent of them were malnourished out of which 24 were severely malnourished i.e. their weight for height was below -3 SD.<sup>3</sup> All severely malnourished children of the area were thus included in this study.

We carried out a pilot interventional study with the objective to improve the growth and nutrition of severely malnourished children to 'normal' weight for height in their home environment. This could serve as a model for replicating this methodology in other parts of the country. In this study we used a High Density Diet (H.D.D.) formulated by Nutrition Support Programme-a Government of Sindh Initiative. This HDD provides 1.4 calories per ml and has a shelf life of one week.

It is a form of locally prepared ready to use food (RUTF). It is made with rice powder, dal powder, milk powder sugar and oil.

RUTF with home based foods has been used successfully with satisfactory weight gain and return of appetite.<sup>11</sup> Use of RUTF at home in addition to greater weight gain also had a lower prevalence of diarrhoea, fever and cough than children who received standard in patient care.<sup>12</sup>

## Methodology

We used a prospective, cohort study design. All children of both sexes < 5 years of age who were < -3SD weight for height according to the WHO classification,<sup>3</sup> were included in the study. An initial baseline survey was done to identify all children who were malnourished. The ones who were severely malnourished were then enrolled. Community Health Workers (CHWs) were identified from the area and initially trained to identify malnourished children, calculate the SD score, identify the danger signs, prepare HDD, and monitor these children for improvement in their nutritional status. After the training, CHW's counseled mothers regarding proper nutrition and diet of children and giving high density dietary supplement. A woman identified from the area prepared the HDD and the CHW's took the required HDD for the children to their respective homes. The first feed was given under direct supervision. The amount consumed in 24 hours was calculated. Initial screening of these children was done to identify any complications such as pneumonia, dehydration, sepsis, severe vomiting and oedema which would require referral to a tertiary care facility for initial stabilization. All children were given vitamin A and other multi vitamins as per WHO guidelines.<sup>3</sup> The children were given iron supplements from the second week for a period of 3 months.

For the first 4-5 days, 100 cal/kg/day were provided which was gradually increased to 120 cal/kg/day over a week. Home made items which included kitchri (rice+lentils), dalia (porridge), banana, chapatti and dal (lentils) were introduced in the diet after the first week along with HDD gradually to provide equal proportions of each and a total of 150 cal/kg/day was targeted as per WHO recommendations.<sup>3</sup>

The patients were monitored daily by the CHW's for the amount of food intake, weight and SD score along with counseling messages.

## Results

A total of 24 children were included in the study. The average age of these children was 2.8 years. All the children were < -3SD weight for height. The mean weight of the children was  $7.5 \pm 1.84$  kg. There were 12 males and 12 females. Eleven children (45.8%) reached -1SD weight for height at the end of 3 months period. Ten children (41.6%) took 4 months to reach -1SD. One child had an accident and could not follow through with the HDD. Two children developed diarrhoea during the rehabilitation phase. They were continued on supplementary feedings while supportive treatment for diarrhoea was given.

## Discussion

This pilot study successfully demonstrated the rehabilitation of severely malnourished children in their home environment. None of the children had any acute complications and did not require referral to a tertiary care facility. Combination of hospital and community based treatment has been found to achieve satisfactory results.<sup>9</sup> Initial screening of these patients can be done to treat patients with complications in the hospital for the first week and thereafter home treatment can be provided in the community. These children were closely monitored and daily counseling to mothers helped in successful weight gain as almost all the children achieved the desired weight. None had any serious infection during the phase of rehabilitation. This is contrary to hospital based care where the child is exposed to cross infections.<sup>7</sup> Cost of care was minimal as the family was at home and they did not incur traveling cost nor did they have to interrupt their routine work. In addition the child was also safe from infections which would have added to the cost of care. Community based therapeutic programmes in Malawi, Ethiopia, and Sudan have shown the cost effectiveness of community based rehabilitation varying from US \$12 to US \$132/year of life gained.<sup>13</sup>

Compliance was not a problem as the mother did not have to visit a health facility and she got advice at her door step as may be the case in hospital based care.<sup>14</sup>

WHO formulated F100 diet - a liquid based diet has been used in the rehabilitation of severely malnourished children in the hospital.<sup>3</sup> This is not recommended by WHO to be used at home as under unhygienic conditions it can serve as an excellent growth medium for pathogenic bacteria. Non milk diets too have been used but have been found to be less effective.<sup>15</sup> Alternatives to F100 diet suggested are ready to use food (RTUF) from locally available ingredients. These have resulted in higher weight gain than F100.<sup>16</sup>

## Conclusion

In this study we used a High Density Diet made from local foods which is easy to prepare, has an adequate shelf life and provides high calories. The diet was accepted and tolerated as evidenced by absence of vomiting or diarrhea as well as satisfactory weight gain. A longer full scale project is planned to further consolidate this approach and use of our locally prepared high - density supplement.

The present study demonstrates that home based treatment with locally available foods can be used successfully in rehabilitation of severely malnourished

children. A larger study preferably at multiple sites should be undertaken to prove the effectiveness of this approach in Pakistan.

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