

Assessment of Hospital Morbidity, Mortality, and Cost-effectiveness of a Nutritional Program for Children Under 5 Years of Age in Pala, Chad

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Summary

This paper analyses the effectiveness of case management at referral level for malnourished sick children in a rural district health system in the south of Chad (Pala district). The methodology followed was based on a cohort study of malnourished children as well as a cost-effective analysis of alternative options for nutritional rehabilitation strategies. Results show that effective case management at hospital level is possible with few resources as long as the nutritional rehabilitation programme is implemented on an integrated basis including early diagnosis of malnutrition for all children admitted to hospital and not to wait for a normal weight-for-height but discharge when the hospital is no longer the best place to avoid further mortality.

Introduction

Malnutrition is a multicausal disease and cannot be tackled in every detail by health services alone. To improve the nutritional status of all children would be difficult to achieve without major improvements in socioeconomic circumstances.¹ However, the healthcare system now has to respond to children suffering from severe and less severe malnutrition.^{2–4}

The environment described in this paper is a district health project of an NGO working in the Mayo-Kebbi region, Chad, since 1991. This report describes the situation in the district of Pala with its 200 000 inhabitants and its hospital. The objective of this paper is to assess the effectiveness of the nutritional rehabilitation programme. The main points of the strategy for the nutritional programme implemented in the Pala district are as follows.

1. The entry point is the sick child at the curative consultation of the FLHS (First Line Health Service).
2. Use of risk factors for screening and diagnosing purposes (weight-for-height in z-score (WHZ) ≤ -3 SD and/or oedema and/or WHZ ≤ -2 SD with associated pathology).
3. Existence of an integrated nutritional rehabilitation programme at hospital level.

Methodology

The methodology was based on a cohort study of malnourished children ($n = 256$) in the paediatric department of the hospital followed-up between April 1997 and January 1998. A cost-effectiveness analysis was also done using the formula: per cent of population in hospital = number of admissions \times length of stay.

Results and Discussion

In our sample, the case fatality rate was 10.6 per cent (excluding death before 24 h) which is lower than usually reported for hospital rehabilitation of severely malnourished children.^{5–7} The case fatality rates in hospital of children with protein-energy malnutrition vary from 9 to 51 per cent. As stated by Waterloo, 'comparison between different centres are clearly inappropriate, because of the differences in the criteria for admission and the prevalence and type of infections, as well as in the facilities'.⁸ A case fatality of 9 per cent was reported by van Roosmalen-Wiebenga, *et al.*^{3,4} who described a field situation very similar to the one in Pala. We may also analyse different indicators for assessing effectiveness of nutritional activities. Gain in weight for children discharged alive (0.54 kg; 0.62 SD) as well as the mean average length of stay in hospital (18.2 days, 18.2 SD) were comparable to other programmes.^{10,11} With regard to effectiveness, the children who abandoned the programme are an important indicator to consider. These children had not gained weight and some had been in-patients for up to 71 days. There is a lack of

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information on the files for further investigation, and comparison from the literature is difficult because little practical information on case management of malnourished children is available. From field experience hospitalization of these children is a serious burden for the family or the mother's income. Even though financial support was made available at the hospital, further social investigation and alternative solutions to hospital care were clearly lacking.

We observed in our sample that the relative risk of dying from malnutrition alone compared to malnutrition and additional pathology was 1.58 (0.79–3.15 CI around RR). A recent analysis covering 28 studies in 58 different countries showed that 56 per cent of children's deaths are attributable to a combination of malnutrition and the potential effects of malnutrition on infectious disease.¹² Being aware of this fact and knowing that prevalence of malnutrition in the general paediatric department of the hospital can be as high as 63 per cent,⁷ it seems important to diagnose malnutrition at hospital level and to include nutritional rehabilitation in the general paediatric department. Case management for malnourished sick children should start on admission.⁶ The problem is not to target a group of children at high risk of dying, as is the case at health centre level. The risk of dying is already so high at hospital level that the gain in probabilistic terms of assessing the severity of malnutrition is eventually no longer interesting. However, as the marginal cost of the test is low and the use of anthropometric indicators for assessing nutritional status are the most easy to measure, it may remain cost-effective to add an operational step for knowing which are the children with malnutrition, be it mild, moderate or severe, not for the sake of assessing the risk of dying but for the diagnosis of malnutrition.

Assuming that effectiveness can be improved by better use of the available resources, a cost-effective analysis of alternative options for nutritional rehabilitation strategies is done at this point. What we want to know is the relative increase in workload to the paediatric department due to the children admitted to the nutritional rehabilitation programme, compared to the total number of children admitted to the paediatric ward using the formula for measuring cost-effectiveness. Accordingly, 1.5 times more hospital days are used for children entering the nutritional rehabilitation programme of the hospital than for the others. There is a need to question ourselves on the usefulness of an average length of stay of 18 days compared to 6 days for the 'normal' paediatric cases. Children are referred to hospital because of a high risk of dying and are included in the nutritional rehabilitation programme because of the probability of dying from a sickness episode (diarrhoea for instance) increases with bad nutritional status.^{13–15}

The objective of the actual strategy for sending a malnourished sick child to hospital is to avoid immediate mortality. Therefore, when the probability of dying decreases (after nutritional rehabilitation has started and infections are treated), there should be a moment

when the technical plateau of the hospital is less efficient and eventually also less effective compared to the care delivered at the health centre or at community level (but this would also need to be assessed). Literature on cost-effectiveness of management for severely malnourished children is not in favour of hospital care.^{10,11,16} It appears that all the controlled trials described in these articles start by 5–7 days of in-patient hospital care or 1 week of intensive day-care before domiciliary care.¹¹ This is important to note because the objective is then to compare the most cost-effective, and eventually the most acceptable, strategy for medium-term nutritional rehabilitation and no longer to avoid immediate mortality. Therefore the question is not to 'is hospital the place for the treatment of malnourished children?'.⁵ The question should be, 'when is hospital no longer the best place for the treatment of malnourished children?'.

Conclusions

It would be an illusion to imagine that in the economical and sanitary conditions of the country, an isolated action at hospital level could bring a long-term solution to the problem of malnutrition. Nevertheless, better awareness of the health personnel on the increased risk of dying for malnourished young children may have a short-term benefit. Moreover, at system level, there is a need for rationalization. Therefore, the following practical suggestions for dealing with hospitalized malnourished children on a more effective basis can be made.

1. Effective case management is possible with few resources as long as a simple and correct nutritional rehabilitation protocol is implemented on an integrated basis. Indeed, it seems possible to improve case management for these children without transforming the paediatric ward into a nutritional centre. Moreover, a short duration of treatment can reduce cost considerably.^{3,4}
2. It appears important in the circumstances described to add early diagnosis of malnutrition for all children admitted to hospital (to drain the malnourished sick children from the paediatric ward into the rehabilitation program).
3. The technical role of the hospital is to reduce immediate mortality. Therefore it is best not to wait for a normal weigh-for-height but to discharge the child when the hospital is no longer the best place to avoid further mortality.

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Checklist for Authors

Originality

Does the study make an original scientific contribution or new observation on the topic?

Usefulness

Are the findings likely to contribute to improved standards of care?

Would the findings have an impact on preventive/promotive care?

Design Features

Is the objective of the study clearly defined?

Is the study design appropriate for the objective?

Are the subjects for the study and their source, as well as the inclusion/exclusion criteria defined?

Are the sampling methods likely to give rise to bias?

Is there a statement included about sample size?

Is the method for collection of data clearly described and referenced for laboratory data?

Are the study and comparison groups similar in all respects except for the topic of inquiry?

Is the response rate satisfactory?

If intervention has been used was the allocation random and blind?

Have the outcome measures been defined?

Are there any drop outs?

Analysis and Presentation

Is the statistical procedure employed (including the software used) clearly stated?

Do the results adequately answer the research question?

Is the interpretation of results reasonable?

References

Are the references relevant to the study and up to date?

Are the references cited in the style required?

Ethics

Are the design and conduct of the study ethical?

Has the permission of the local ethical committee been sought and received?