Management of severe malnutrition

Severe malnutrition is defined as a severe wasting (< 70% weight for length or < -3 Z-score) and/or oedema.¹ The global estimate of wasting is approximately 10% (approx 55 million children), with severe wasting at 3.5% (approximately 19 million children).² Stunting, however, is regarded as a problem of greater magnitude than underweight or wasting, as it more accurately reflects nutritional deficiencies and illness that occur during the most critical period of development and growth.² Twenty four countries account for more than 80% of the worldwide burden of chronic undernutrition (i.e. stunting). South Africa is counted amongst one of these countries.³ It is not surprising that stunting is highest for the poorest segments of the population within countries.² Stunting affects approximately 195 million children under the age of five years.³ Malnutrition is an underlying factor in approximately 50% of the nearly 10 million deaths in children under the age of five years from preventable causes.⁴

Serious attention needs to be paid to the long-term effects and burden of underturnutrition. The child is at its most vulnerable during the period of most rapid growth and development (this includes the period of significant brain formation).² Chronic undernutrition results in diminished cognitive and physical development.³ Early growth failure (within the first two years of life) is associated with reduced adult stature, which in turn is associated with lower educational achievement as well as lower economic status in adulthood through reduced productivity and income earning capacity.³ The situation is further exacerbated by the increased risk of chronic disease in adulthood in children who had deficient growth before the age of two years, but experienced rapid weight gain in later stages of childhood.³

Globally, progress toward achieving the Millenium Development Goals (MDG) has been varied, with some countries, most of them in sub-Saharan Africa, actually worsening in terms of the numbers of children who are underweight. The stunting prevalence has not decreased in the sub-Saharan Africa since the mid-1990s, with South Africa being one of these countries according to UNICEF.⁶,⁷ Furthermore, South Africa has shown an increased trend since 1990 in the mortality of children under the age of 5 years.⁸

There is, however, difference in the statistics given by UNICEF and the National Food Consumption Survey. From the NFCS there appears to be a slight decline in stunting from 1994 to 2005 at 23% and 18 % respectively. In the Western Cape stunting has remained static at around 12%. However, it would appear that the prevalence of wasting over the same period has increased slightly from 3 to 4.5 nationally and alarmingly from 1 to 11.5 % in the Western Cape in the period from 1994 to 2005.⁹

Annually large amounts of money are invested to improve nutritional outcomes in poor countries by the international community. Approximately $250–300 million a year for the first half of this decade was invested in basic nutrition. This, however, translates to just over $2 a year per infant for the 130 million infants who could benefit from the investment. This is less than the estimated $5–10 per child which effective large scale community nutrition programmes should be spending. Interestingly HIV/AIDS receives $2.2 billion per year in foreign aid, although it contributes less to “disability adjusted life years” than does child undernutrition. The serious consequences of undernutrition are not well understood at “high level”.⁷

National policies

To achieve the first MDG target depends to a great extent on the effective implementation of large scale nutrition and health programmes that will provide appropriate food, health and care for all children within a country.²

The Lancet series¹⁰ reviewed the national strategies that have been proven to work. The interventions that had the greatest impact on reducing malnutrition and mortality were: iron supplementation, salt iodisation, vitamin A supplementation for children aged 6–59

Abstract

In summary, if the Millenium Development Goals (MDGs) are to be addressed effectively, it is imperative that severe malnutrition be addressed at the international and national level, using strategies that work, and that additional resources are committed to improving hospital treatment and establishing community-based rehabilitation programmes.²⁰ Many gaps still exist in our knowledge regarding the management of severe malnutrition at all levels. Until such time when research can fill these gaps, we will have to continue to use what guidelines have shown to produce positive results.
months, breastfeeding strategies based on individual and group
counselling, zinc supplementation in the management of diarrhoea,
fortification of staple foods, behaviour change, communication
to improve complementary feeding and interventions to improve
hygiene practices.3,10

Certain actions have been found to be ineffective in reducing
undernutrition such as growth monitoring (unless it is linked to
adequate nutrition counselling and referral), preschool feeding
programmes targeting children older than 24 months of age and
school feeding programmes targeting children older than five years
of age. This last strategy may, however, have non-nutritional benefits
for education.10

Though not all effective strategies can be generalised for all
countries, a sizeable effect can be achieved with high coverage of
four or five proven interventions.11 However, for national strategies
to be effective, commitment is required from all the country’s role-
players. In spite of the dire statistics, nutrition remains a low priority
on the national development agendas of many countries and often
has no clear institutional home.3,11

Undernutrition often remains unnoticed until it has reached a severe
level. Children may appear healthy even whilst facing the grave
risks associated with undernutrition. Policy makers often do not
understand the urgency of the situation and may not understand
how improved nutrition contributes to long-term national, social and
economic goals.3

In many cases, national programmes do not fully succeed due to the
lack of political commitment (defined as the allocation of human,
financial and organisational resources).11 National leaders and
those who control national financial resources are more likely to be
more successful in promoting nutrition strategies than public health
advocates or technical staff from donor or UN agencies. Nutrition
goals therefore should be included in all appropriate government
sectors and their policies and operations. National sectors, other than
Health, may also have an impact on nutritional status e.g. economic
policies to address poverty, trade and agriculture, opportunities that
are often under-exploited.11

However, political commitment to nutrition will also only result in
improvements in nutritional status if supported by interventions
that are effective and that are able to be implemented at high and
sustainable levels of coverage. Historical evidence has shown that
the nutrition of mothers and children can be improved relatively
quickly, given the combined effort politically, strategic planning and
adequate resources.11

Paradoxically, South Africa has poor health outputs and outcomes
despite relatively high health expenditure and many supportive
policies. The poor successes of policies are often due to the failure
to build capacity to implement the policies and programmes and
to monitor implementation. A great deal of attention and resources
(including medical personnel) have been absorbed by a few health
programmes, e.g. HIV programmes. South Africa’s commitment to
the MDGs is being crippled by the relentless rise in the burden of
diseases which is leading to a vicious cycle of increased expenditure,
distorted responses by the health system, out-migration of human
resources and increased social issues.12

The difficulties in implementing effective national strategies
successfully is further exacerbated by an international nutrition
system that has little respect for country generated plans, local
timetables or political processes of a country.11

**International actions**

International initiatives often do not have the desired effects as
they often behave adversarially and compete for attention. They
also often siphon off scarce human resources and promote poorly
designed solutions to problems that they cannot solve on their
own. The function of international initiatives should be to directly support
national structures in high burden countries and to produce “global
public goods” e.g. setting standards and identifying priorities;
mobilising, pooling and distributing financial resources; providing
nutrition services where national sectors are unable or unwilling to
do so themselves; strengthening human and institutional resources
through training and capacity building and finally research and
development.7

The international community devotes few resources to nutrition-
related organisational development in low and middle income
countries. Many of the major international organisations seem to
lack appropriately skilled staff at central level.

Efforts to manage undernutrition internationally have up to date
mostly been fragmented. The Lancet series recommended that all
interested parties working to eliminate undernutrition should come
together to review the structures that are currently in place; at how
to simplify the current system; how to strengthen regional and sub-
regional networks; and to develop a strategy to prioritise topics
for research.7 The path forward, from projects and evidence from
randomised controlled trials to developing large scale programmes
with sound design to achieve results, needs to be identified.4

**Facility-based management of severe malnutrition**

Probably the best known international initiative for the management
of severe acute malnutrition is the WHO guideline, Ten Steps for the
management of severe malnutrition; promoted as the standard by
which severely malnourished children should be treated.13,14

The literature indicates that if implemented correctly, the protocol
can improve case fatality rates from around 40% to the order of
1–5%.4

When reviewing the evidence on which the Ten Steps are based, it
will be found that many studies were conducted in the 1960s and
1970s where it became clear that high protein and fluid intakes
> 150 ml/kg during the initial phase increased mortality, and that
careful feeding regimens initially increasing in volume and density
toward a high energy formula to aid rapid catch up growth, reduced
mortality.10 These studies eventually led to the development of the
WHO protocol.

In 2006 Brewster published a critical review of the evidence on
which the WHO guideline is based. The review highlights a number of
aspects where the WHO guidelines may be lacking in evidence and
which may be important to consider. He pointed out that there is a
lack of evidence that the high mortality rates are directly proportional
to the quality of care and that the severity of illness is also largely a
contributing factor. He also suggests that a protocol alone is not
sufficient in adequately managing severe malnutrition, but that an
experienced health worker made better clinical judgments than
one who follows a protocol.16 There appears to be support for
recommendations made by the WHO on the necessity of routine
empirical antibiotic treatment, the prevention of hypoglycaemia through small frequent feeds, zinc supplementation, delayed iron supplementation, but that it may be preferable to provide smaller daily doses of vitamin A than a single large dose and that children with kwashiorkor may require more potassium than recommended.16,15

The F75 and F100 formulas as recommended by the WHO must also be evaluated critically. These formulas have a number of apparent shortcomings that need to be addressed. Both formulae have high osmolalities, namely 333 and 419 mOsm/l and lactose contents of 13 and 42 g/l respectively.16 The importance of lactose intolerance in severely malnourished children tends to be downplayed. Enteropathy is often a feature of severe malnutrition and is usually accompanied with clinically significant carbohydrate intolerance with osmotic diarrhea.17

It is uncertain what the rationale is for the very low protein content of the F75 formula at only 4.8% of energy as protein. An implication of the very low protein content is that the phosphorous requirements recommended by the WHO are not met.16,17

Another matter for concern in many countries with a high burden of severely malnourished children is the poor accessibility to the commercially F75 and F100 diets recommended by the WHO. So health facilities need to mix their own formulae and have to add their own mineral and vitamin mixes.15 A matter that is not being considered, is the risk of nosocomial and food-related infections when milk formulae are prepared. In a study conducted in 2008 in 18 public health facilities in South Africa by the DOH, it was found that a vast majority of the samples of powdered infant formulae tested positive for pathogens after preparation, indicating inadequate hygiene during feed preparation.18 It only stands to reason that a feed that requires a greater variety of constituents will run an even greater risk of being contaminated during preparation. Another shortcoming of mixing the formula from the recipe is that not all facilities have access to the vitamin and mineral mixes required to make up the micronutrient content. There is therefore a need for an affordable, hygienic and nutritional adequate alternative to the F75 and F100 recipes. Brewster17 pointed out that there are shortcomings in the guidelines in that the management of “marasmus” vs “kwashiorkor”; HIV negative and positive children; and teaching hospitals and rural hospitals are all “lumped” together. The WHO has confirmed that gaps in knowledge remain, particularly in the feeding of very young infants and also infants living with HIV/AIDS.19

Community-based therapeutic care

The area in the management of severe malnutrition that is enjoying considerable amount of attention is community-based therapeutic care.

Community-based care refers to treatment that is implemented at home with some external input such as a health worker.14,16 Motivations for implementation of community-based therapeutic care include factors such as hospital budgetary constraints, bed shortages, the reduction of hospital-acquired infections and requests by families for early discharge due to concern for the care of other family members or loss of earnings.20 One disadvantage to community-based care, is that the weight gain is often less than what is achieved during hospitalisation.

Community-based treatment occurs once the initial stabilisation phase during hospitalisation is completed. The initial stabilisation usually lasts two to seven days. Thereafter there are three main options for community-based care, namely: short-stay day care, rehabilitation at home with clinic visits, or rehabilitation at home with Ready to Use Therapeutic Foods (RUTF). There are advantages and disadvantages to all three option, and the option best suited to the situation should be considered.20 The international trend seems to be toward the third option of rehabilitation at home with RUTF. The RUTF is a paste where part of the skim milk is replaced with a groundnut paste. It is more energy dense than the F100 formula, but has a similar nutrient to energy density ratio.15,20 The advantages of the RUTF is that it does not support bacterial growth, can be consumed without the addition of water or processing, it is energy dense without the high osmolality problem.19 There is also some evidence that the RUTF supports better weight gain than the F100.16,20 Limitations however to the RUTF are the high cost of the product, sharing of the product with other family members, compensatory reductions of home food and poor compliance.15

Community-based care will however only be effective if the infrastructure and adequate resources (including nutrition educators) are in place to provide the support to the mothers and caregivers after discharge. The mother or caregiver requires training on the importance of adequate feeding and rehabilitation at home and the child’s monitoring either through home visits or at the clinic.20 Therefore, optimal community-based rehabilitation requires careful planning and cannot be implemented without considerable initial inputs and resources being in place.20

References:


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