

# Improving child survival: Malnutrition Task Force and the paediatrician's responsibility

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Malnutrition (underweight) contributes to approximately 60% of all child deaths, yet health professionals, policy makers, and donor agencies often fail to recognise its relevance to child survival. There is a need for the paediatric community to champion the importance of adequate nutrition for normal growth and development, and of placing sufficient emphasis on the prevention and treatment of malnutrition. Many severely malnourished children die from inappropriate treatment. Case fatality rates of 25–30% are commonly found and in some hospitals as many as 50–70% will die. Many of these deaths are avoidable. Weaknesses in health systems, inappropriate training of doctors and nurses, inadequate supervision, and lack of support for staff all contribute to compromised quality of care. The International Union of Nutritional Sciences, with support from the International Pediatric Association, launched a global Malnutrition Task Force in 2005. The main objective is to ensure that an integrated system of prevention and treatment of malnutrition is actively supported as a fundamental aspect of care, and becomes an integral part of all training programmes.

malnutrition related child deaths/year. Neonatal disorders, diarrhoea, pneumonia, and malaria are the main reported causes of under-5 mortality (table 1), but malnutrition as an underlying cause does not appear in routine statistics and so its importance is easily overlooked. As a result, health professionals, policy makers, and donor agencies often fail to recognise its relevance in child survival strategies and do not place sufficient emphasis on its prevention and treatment. Part of the explanation for the important underlying role of malnutrition in child deaths is that almost all nutritional deficiencies, including vitamin A and zinc, impair immune function and other host defences,<sup>4</sup> leading to a cycle of longer lasting and more severe infections and ever worsening nutritional status. Thus inadequate intake, infection, and poor nutritional status are inexorably entwined. Well nourished children rarely die from diarrhoea and common childhood infections, and maintaining a good nutritional status should be an integral part of improving child survival.

Adequate nutrition is also essential for normal growth and development, which represent the essence of good health. Achieving this potential maximises neuro-cognitive development and creates the individual capacity to withstand a wide range of environmental stressors. For effective and safe practice, all healthcare workers need a basic understanding of the role of nutrition in growth and development, but above all paediatricians represent the critical professional group that should possess a deeper understanding of nutrition for the wellbeing of every child.

## WHY IS MALNUTRITION EASILY OVERLOOKED?

At national, community, and hospital levels, no data are readily available for advocacy in terms of lives to be saved by preventing or treating malnutrition. Most national statistics on mortality are compiled from records in which a single cause of death is reported: malnutrition as an underlying cause does not feature. At the country level, data describing the prevalence of underweight, wasting, and stunting are collected in national surveys, but these fail to reveal anything about the enormity of their contribution to child mortality. Severe wasting has been estimated to contribute to 1.7 million child deaths/year by Collins *et al*<sup>5</sup> from the UNICEF global database and applying the epidemiological approach of Pelletier.<sup>6</sup> This startling figure is certainly an underestimate as it does not include deaths among children with the oedematous form of

In this commentary we highlight the role of malnutrition (measured as low anthropometric status) as a major contributory cause of child death and urge the paediatric community to champion the need to improve both its prevention and treatment. In 2000, governments pledged to reduce under-5 mortality by two thirds by 2015 (Millennium Development Goal 4); huge efforts will be needed if this goal is to be attained in the 10 years that remain. It is inconceivable that the target can be achieved without adequate attention to nutrition, but appropriate attention to nutrition brings the target within reach at a stroke. Currently, across the world some 10.8 million children under 5 years of age die every year (30 000 per day).<sup>1</sup> Most of these deaths are preventable and almost all occur in poor countries. Sub-Saharan Africa and south Asia account for 41% and 34% of global child deaths respectively,<sup>1</sup> so efforts to improve child survival in these regions are especially important.

Tackling malnutrition is essential as low weight-for-age (<-1 SD) underlies 53–60% of child deaths,<sup>2,3</sup> representing 5.7–6.4 million

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**Table 1** Distribution of global child deaths by cause and the percentage attributable to underweight (< -1 SD weight-for-age)

Cause	Distribution of child deaths by cause (%)	% attributable to being underweight
Neonatal disorders	33	Work in progress
Diarrhoea	22	61
Pneumonia	21	53
Malaria	9	57
AIDS	3	Work in progress
Measles	1	45

Source: Black *et al.*<sup>1</sup>

severe malnutrition (kwashiorkor), as children are not usually examined for oedema in national health or nutrition surveys. In some geographic regions, kwashiorkor deaths outnumber deaths from other forms of severe malnutrition, so actual child deaths from severe malnutrition will far exceed the estimate of 1.7 million/year. Whereas the plight of severely malnourished children may be highlighted in the news coverage of humanitarian emergencies, the daily grind of silent suffering is unobserved. The economic value in preventing and treating malnutrition as integral to the achievement of health development is not adequately appreciated, and the issue remains hidden at the national level.

At the community level, malnutrition is also largely hidden because disinvestment in primary health care has meant that outreach services in many countries have been disbanded. Consequently malnourished children are not identified and many die at home without professional health care. National health worker training in the WHO programme of Integrated Management of Childhood Illness (IMCI) has stagnated at <10% in most countries due to insufficient investment and health system constraints.<sup>7</sup> Even where IMCI training is continuing, the nutrition component is sometimes reduced or not attempted because of time constraints, and clinic staff may not be equipped to provide nutrition counselling or specific advice for effective prevention and treatment of malnutrition.

In hospitals in developing countries, severely malnourished children comprise a significant proportion of paediatric deaths. This is not because there are more admissions for severe malnutrition than for other conditions but because a higher proportion of them die. Many die unnecessarily due to outdated practices and because doctors and nurses are unaware of their special needs.<sup>8</sup> This disproportionate contribution of severe malnutrition to inpatient paediatric deaths is rarely recognised by doctors or administrators: children may not be routinely weighed on admission and malnutrition is likely to be entered as a diagnosis only if there are no other presenting clinical conditions. Most severely malnourished children are reported as cases of gastroenteritis or pneumonia, so malnutrition may not appear in hospital statistics.

Health policy makers are being encouraged to adapt child survival strategies to fit the local epidemiology and be country focused. If local data are not readily available regarding malnutrition related deaths, there is a serious risk that malnutrition will not receive the emphasis it deserves in national child survival strategies. The paediatric community must therefore be vigilant and advocate for its inclusion.

## IMPROVING CASE MANAGEMENT OF SEVERE MALNUTRITION

Many malnourished children die from inappropriate treatment. Severely malnourished children undergo physiological

and metabolic changes to conserve energy and preserve essential processes, including reductions in the functional capacity of organs and slowing of cellular activities.<sup>9</sup> If these changes are ignored when prescribing treatment, severely malnourished children are put at increased risk of death from hypoglycaemia, hypothermia, electrolyte imbalance, heart failure, and untreated infection. Consequently case fatality rates of 25–30% are commonly found.<sup>8</sup> Rates are even higher in some hospitals where as many as 50–70% die. In two South African hospitals, 50% of deaths in 2000–01 among severely malnourished children were attributed to doctor error and 28% to nurse error. Had these preventable deaths been avoided, mortality would have been 5% instead of 24%. Weaknesses within the health system, especially inappropriate doctor and nurse training, inadequate supervision provided by nurses, and lack of simple support systems for staff, compromised quality of care and contributed to the increased loss of life.<sup>10</sup>

Recognising that poor paediatric care underlies and contributes significantly to increased mortality, WHO has developed guidelines for treating severe malnutrition<sup>11–12</sup> and a training course for doctors and nurses.<sup>13</sup> The evidence base is wide ranging.<sup>14</sup> The guidelines set out 10 steps for routine case-management. The initial stabilisation phase focuses on the following:

- Feed every 2–3 hours, day and night to prevent hypoglycaemia and hypothermia
- Keep warm
- Rehydrate with low sodium fluids; monitor closely for signs of fluid overload; avoid intravenous fluids, except in shock
- Give 100 kcal/kg body weight/day and 1 g protein/kg/day
- Give potassium and magnesium to correct electrolyte imbalance; restrict sodium
- Give micronutrient supplements; do not give iron
- Give broad spectrum antibiotics even when clinical signs are absent as infections can be silent.

The rehabilitation phase includes:

- Rebuilding wasted tissues with high energy, high protein diets and micronutrients
- Psychosocial stimulation to improve mental development
- Preparation for continuing care and follow up after discharge.

Where the guidelines have been fully implemented, mortality has been reduced by at least half. Examples of impact are given in table 2. If all hospitals in developing countries followed the WHO case management guidelines for severe malnutrition, perhaps a million or more lives would be saved. This will require recognition of the importance of malnutrition in clinical practice, establishing a severe malnutrition ward or “corner” where correct treatment is provided day and night, having adequate supplies, and having ward and emergency staff trained in malnutrition case management. Two major obstacles are that most doctors and nurses are unaware of the guidelines as they are not part of their basic training; and health systems fail to provide the supportive supervision and leadership, and sometimes the resources, to put the guidelines into practice effectively. Very high case-loads constrain quality improvement. In Kenyan district hospitals, for example, one nurse may have responsibility for up to 50–60 ill children (James Berkley, personal communication). Even with prioritisation of tasks and training mothers and other carers to assist with feeding etc, such high case-loads are incompatible with adequate care, and the

paediatric community must demand greater investment in health in developing countries, especially at the district level.

Important strides have been made in improving case management of severely malnourished children in humanitarian emergencies, and caring for families in their communities is being emphasised rather than encouraging them to move and congregate in huge camps, where diseases easily spread.<sup>23</sup> Community outreach workers screen children for wasting and oedema; those who have mild/moderate oedema or are severely wasted but have a good appetite and are alert and appear clinically well, are treated at home with ready-to-use therapeutic food, with weekly or fortnightly supervision. Only those who have poor appetite or are ill, or have severe oedema, or oedema plus wasting, are referred for inpatient care.<sup>23</sup> This reduces congestion and crowding in the inpatient facilities, and may reduce hospital caseloads. In 21 programmes in Malawi, Ethiopia, and Sudan, more than 22 000 children have been treated in this way, with a case fatality rate of 4.8%.<sup>5</sup> This illustrates the importance of community outreach, early diagnosis and effective action, and has also been applied in non-emergency, resource-poor settings.<sup>24</sup>

### ROLE OF THE PAEDIATRIC COMMUNITY

The current widespread problem of mismanagement of severe malnutrition has its origins in poor training and practice of doctors, nurses, and other health professionals. It is unusual for the appropriate case management of severe malnutrition to be included in undergraduate medical training.<sup>25</sup> It is similarly neglected in undergraduate nurse training. Even in Africa where doctors and nurses in district hospitals will be treating such children on a daily basis, the teaching of case management of severe malnutrition fails to receive appropriate emphasis. The result of this persistent

oversight is clear: severely malnourished children with dehydration, pneumonia, and other infections are treated just like well nourished children with these conditions with disastrous consequences. Paediatricians can help change this practice by advocating that all children be checked on admission for severe wasting and oedema, and that severely malnourished children be treated according to WHO guidelines, even though they may have presented with a comorbidity.

Even in industrialised countries, paediatricians will from time to time see individuals with severe malnutrition, and all doctors will at some time in their career come across patients with poor nutritional status. Standards of clinical care are often set by practice in developed countries, and it is expected that minimum standards of safe care are established early in any professional career.<sup>25-26</sup> The paediatric community has a responsibility to ensure the WHO malnutrition guidelines are included in paediatric texts and in medical and nursing curricula, especially in Africa and Asia. At present, even some of the most prestigious and widely used paediatric textbooks contain information about case management that is wrong and harmful. Paediatricians must provide newly qualified doctors with support and supervision in correct case management of severe malnutrition and should be responsible for ensuring that the guidelines are implemented in all teaching hospitals so that trainee doctors and nurses can learn correct treatment through supervised practice. Paediatricians should have a key leadership role in setting up and supporting multidisciplinary teams to deliver improved inpatient care, and in establishing audit and feedback mechanisms. They also have a role in forming linkages at the community level to ensure continuing care after discharge, and intersectoral linkages to address underlying causes of malnutrition and ill health.

**Table 2** Examples of impact on case fatality rates of implementing the WHO guidelines

Country	Case fatality (%) before	Case fatality (%) after	Main changes made
<b>Asia</b>			
Bangladesh <sup>15-16</sup>	17 (49/293)	4 (71/1795)	IV fluids restricted to those in shock Slower rehydration Antibiotics started straightaway Given less protein, Na, lactose initially Tube fed if anorexic Given K, Mg, Zn, Cu, folic acid, multivitamins
India <sup>17</sup>	8 (4/50)	4 (4/100)	IV fluids restricted to those in shock Low Na ORS (ReSoMal) F75 milk (less protein, Na, lactose initially)
India*	22 (19/88)	7 (2/28)	IV fluids only if in shock Low Na ORS (ReSoMal) Given potassium Given less protein, Na, lactose initially
Myanmar <sup>18</sup>	16 (25/157) 18 (10/55)	9 (16/186) 5 (3/66)	Comprehensive changes Comprehensive changes
<b>Latin America</b>			
Brazil <sup>19</sup>	34 (47/139)	16 (19/117)	Comprehensive changes but still overusing blood transfusions
<b>Africa</b>			
Malawi <sup>20</sup>	55 (11/20)	16 (3/19)	Comprehensive changes but still not fully implemented for dehydration, hypoglycaemia and hypothermia
South Africa	35 <sup>21</sup> (10/29) 25 <sup>10</sup> (18/71) 46 <sup>10</sup> (12/26) 45 <sup>†</sup> 30 <sup>22</sup>	18 (23/125) 18 (18/98) 21 (10/48) 9 (10/113) 6 (8/138)	Comprehensive changes but still not fully implemented for dehydration, initial care and night feeds in ref 21, and not always implemented with sufficient care in ref 10

\*Personal communication (Gupta R, Sharma DK).

†Personal communication (Ashworth A).

There is a need to advocate for reinvestment in primary health care, especially in the poorest countries, to deliver accessible preventive and promotive interventions<sup>27, 28</sup> and identify malnutrition at an early stage so that it can be treated in the community. This will require training community health workers and other cadres,<sup>28</sup> and integrating primary health care with activities to improve economic development and living conditions, including food security. Too often interventions to promote health and nutrition are vertical, isolated from social development, and do not address the underlying causes. Nevertheless there are examples of good health and nutrition at low cost from Costa Rica, Cuba, Sri Lanka, China, and Kerala State in India<sup>29, 30</sup> where community mobilisation, a strong political commitment, and equitable access to health services were accompanied by declines in malnutrition and child deaths.<sup>30</sup> Health professionals in rich countries can play their part by supporting movements such as Medact and responding to the call for action in the People's Health Charter<sup>30</sup> which seeks to counter the threats to health posed by, for example, economic globalisation, third world debt, structural adjustment programmes, and pricing policies of multinational pharmaceutical companies.

## THE WAY FORWARD

In order to ensure that case management of severe malnutrition becomes an effective element within the overall ambition of improving child survival, there clearly has to be substantial improvement in awareness and in the acquisition of the skills needed for effective case management. Paediatricians have a critical responsibility in ensuring that opportunities are created, and that as a profession they do not act as a block to progress. The International Union of Nutritional Sciences (IUNS) launched a global Task Force on Malnutrition in September 2005, with support from the International Pediatric Association (IPA). The main objectives are to:

- Establish three regional networks (south and southeast Asia; sub-Saharan Africa; Latin America) to coordinate technical expertise and develop capacity building partnerships
- Raise the profile of malnutrition among health policy makers and donor agencies and advocate for increased recognition of its importance in child survival
- Work with partners to build capacity to prevent and treat malnutrition, especially in countries with high child mortality
- Advocate for inclusion of malnutrition in medical and nursing curricula and for the WHO case management guidelines to be implemented in all paediatric wards where severe malnutrition is found
- Encourage health workers to undertake operational research to monitor and improve their performance and provide data for advocacy action
- Raise resources
- Publish and disseminate the findings and experiences.

Through the joint efforts of nutritionists within the IUNS and paediatricians through the IPA it should be possible to build a strong collaborative alliance which can work to ensure that this particular strand of the child survival strategy is not overlooked, but actively supported as a fundamental enabling strand of effective care. Collectively, they have the capability of bringing together the critical abilities and enthusiasm in nutrition and child care to ensure that the fundamental shift in approach which is needed can be achieved and sustained. The challenge is substantial and it is imperative that all

paediatricians engage to play their part in making this fundamental change a reality. Coordination and organisation within and between the three regional networks will be critical. Within its international portfolio, the Royal College of Paediatrics and Child Health (RCPCH) has already accepted responsibility for making a contribution to the training of paediatricians in sub-Saharan Africa. By ensuring that appropriate case management is included as an integral component of all training programmes, and responsibly examined as an integral aspect of the training of all paediatricians, the College has the opportunity to set an exceptional example of better practice which will directly and indirectly save many lives each year. The RCPCH, with the IPA, represents one of the few professional bodies in the world that fully embraces a responsibility for international affairs within its concern for all children, and at the same time has a high level of skill and experience in paediatric nutrition. Moving the activity of the Task Force on Malnutrition from a good idea to a force with the ability to make an important difference is a difficult challenge. The special mix of experience, capability, skill, and advocacy embraced within the College provides the opportunity for creating an example of how to ensure better practice and to make a difference by doing simple things well, which would be of great help and benefit across the world.

The shame of children dying of malnutrition is a blot on the conscience of us all, and children deserve better. In a rational world appropriate care would be put in place to manage problems at an early stage. Ultimately, a clear understanding of how best to care for the sickest children improves care in the community, which in turn leads to a higher level of awareness and prevention of the problem in the first place.<sup>31</sup>

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