

MALNUTRITION AND CHILD MORTALITY IN THE DEVELOPING WORLD 17th February
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Professor Hill trained as a nutritionist in the early 1960s, then went to Jamaica to discover the physiological & metabolic affects of malnutrition. She was first assigned to measure food intake & energy output of farming families in the hills of St Mary. To get there from Kingston, where she was living, meant a car drive then a walk – pleasant in the early morning with the mist rising. A photo of her with the first family she studied showed they were all shorter than her, even the father.

Child mortality is defined as death under the age of five. Most occurs in poor sub-Saharan and south Asian countries, with half the 7.6 million deaths/year occurring in just six countries: India, Nigeria, China, Pakistan, Democratic Republic of Congo, and Ethiopia (rural India & China are still poor). A target was set in 2000 to reduce child deaths in each country from the 1990 level by two-thirds by 2015. The target is unlikely to be met in southern and central Africa where there is least progress. Over half child mortality is associated with malnutrition. Mothers need to be able to recognise illness – a child can look like a healthy three-year old when twice that age – the Jamaican family she first visited were all stunted. An underweight child is more susceptible to infections & less able to recover – often dying. Child death is mainly caused by: Perinatal problems 22%, Pneumonia 18%, Diarrhoea 15%, Malaria 8%, Measles 5%, & HIV/AIDS 4%. Vaccination has already made measles rare in East Africa. Illness can make a child reluctant to eat, or the mother reluctant to provide food which will not stay down – which is why diarrhoea, with loss of hydration and vital nutrients, is so serious.

Breast feeding exclusively for six months, with no other food or water, then continued breast feeding but with complementary food to 24 months, is the best way to give a child a healthy start, preventing pneumonia, diarrhoea and malnutrition. Even in tropical climates breast milk contains sufficient water - something that astounded Professor Hill's Jamaican husband. A mother's milk should be good unless food shortage is very severe or she is overworked.

She gave an example of her research to find effective ways of achieving exclusive breastfeeding. This was from 1998 to 2001 in four small towns in NE Brazil - they had three local hospitals, who separated mother and baby immediately after birth, and provided free milk on the wards. Homes were of mud brick with poor sanitation. Fewer than 1% of babies were exclusively breast fed, and outcomes were poor. Hospital training started along the lines of the UNICEF/WHO Baby Friendly Hospital initiative (BFHI). Also, they trained health visitors to support mothers at home, even such basics as telling mothers to hold the baby up to avoid getting nipple sores, and letting the baby get a good feed. Half the mothers were randomly assigned to receive 10 home visits and the other half had none. The visits were twice in the first week, soon fortnightly then longer intervals with a tenth visit at 6 months. They found that while at hospital two-thirds of mothers of both groups breast fed exclusively, but the proportion declined rapidly in the group with no visits. By the end of the six months 25% of the visited group were exclusively breastfeeding compared with 3% of the unvisited (even this was better than when the team first arrived). Thus the BFHI initiative is not enough by itself, and follow up visits are necessary. The method, now with 8 visits, has been extended to a population of 2 million, to as good effect as the original project.

Malnutrition is shown externally by puffy feet & hands, bones sticking out, and peeling skin. Muscles are wasted and there is no fat; moreover all organs are affected, and the metabolism disordered. For instance if the skin of a normal child who is dehydrated is pinched it will spring back, but the skin of a malnourished child will remain limp.

When a malnourished baby is brought in to a hospital, maybe after an arduous journey, the advice is to take the mother and child straight to the head of the queue. Immediately give the child a sugary drink and start antibiotics to deal with any infections (don't wait for lab results - they often have at least one infection). Put the child in a draught free ward, keep it warm & dry, replace wet bedding, and ensure good hygiene. The baby's metabolism must be reordered – treating the visible symptoms as for a normal child may do more harm than good. Feed every 2-3 hours day & night (night nurses usually like to get things done when they come on the ward, then leave patients to

sleep). Hydrate them, but slowly at first (so as not to overload a shrunken heart); avoid sodium but give potassium & magnesium; do not give diuretics for oedema. After a week or so the child's appearance will improve – and be unrecognisable to the mother. The child will start to eat ravenously, gaining weight at twenty times a normal rate; and should be in good health in five weeks, ready to go home.

In 1973 Professor Hill went to two hospitals in a poor part of Jamaica and found they were using outdated practices, had two children per cot, with a 6 month recovery period & 50% mortality. The hospitals had no knowledge of correct practices and no journals. She helped to write guidelines then ran a training scheme. One hospital flatly said they had too few nurses or resources to respond. So she had one child treated: and convinced them. The guidelines were followed; children from the local school were drafted in to help feeding. The Ministry of Health was approached to set up a nutrition unit. A Caribbean-wide training scheme was introduced, and by 1978 infant mortality had dropped to below 5%. In 1981 WHO used the guidelines as a basis for their own ten step guidelines, which have been introduced worldwide. Professor Hill emphasised the problems of getting practices applied: publish in medical/scientific journals - publish treatment guidelines – give training (in-service to senior staff, who then train junior staff). But this is not enough.

A study was made in the Eastern Cape Province of South Africa, where 11 hospitals had mortality during treatment of malnutrition ranging from 46% to 10%. All then received the same training to improve treatment but the results were variable. Some succeeded but others soon slid back. The two best & two worst hospitals were compared: the worst were not giving in-service training nor inducting new staff, nor supervising the mothers; there was no investigation of a death.

Home visit studies found that while three quarters of mothers remembered what food they should be giving their babies, they could not afford it. However, there is a child support grant for poor families in South Africa; but registering for it involved a journey to an office (that might be closed) and a birth certificate that they often would not have, or had left at home. This issue was brought to the attention of the press who highlighted it; a television programme was broadcast and the next day the Minister of Social Development went by helicopter to the area, and arranged for a van to act as a mobile office to register eligible children for the grant.

Progress is being made worldwide, and lessons learnt are being applied in the treatment of other diseases. Professor Hill's final picture was of three smiling children.