

**Wenhui Daily**

**(11/07/2017 – Shanghai)**

**The Warmth and Magic of Personalized Nutritional Prescription Shortens Children’s Length of Hospital Stays**



*A nurse feeding a baby with special formula milk*

Clinical Nutrition is often neglected in medical care and patient population, but it does not mean that it’s not important. In fact, it can affect the development of course and the outcome of treatment. The Shanghai Children’s Medical Centre (SCMC) has embarked on a new endeavor: nutrition assessment and nutrition support therapy for children with the active involvement of nutrition department. This innovative service is called “individualized nutritional screening assessment information system for helping clinical decision”. After practicing for more than a year, both doctors and patients have witnessed the positive outcomes (“magic”) of “personalized nutritional prescription” – **shortened the length of children’s hospital stays; reduced hospitalization costs; and decreased the incidence of infection.**

**Malnutrition, affecting the clinical outcome of severe pediatric patients**

Chenchen, who suffered from congenital heart disease and weighed just 2,200 grams at birth, underwent surgery at Shanghai Children’s Medical Centre (SCMC) on the 9<sup>th</sup> day after his birth. He can only be fasting, with the support of TPN (total parenteral nutrition) after the operation.

Even worse, he was again sent into the operating room only five days after the first operation due to severe abdominal distension and acute necrotizing enterocolitis, and received an ileostomy this time.

Serious illness and two surgeries are quite a huge physical challenge for such a little baby. Post-operative nutrition is one of the key factors for recovery. At this moment, the nutrition doctor and the dietitian visited Chenchen to discuss his personalized nutritional prescription.

Personalized nutritional prescription is a process of constant adjustment and testing. According to the feeding principle that food should be from less to more, from thin to thick, the dietitian and the nutrition doctor were repeatedly trying to restore his nutritional status, combining with a variety of other nutritional support methods such as parenteral nutrition infusion, continuous enteral drip feeding, gradual increase of oral feeding. Enteral feeding is of great importance to the recovery of intestinal function.

Fortunately, these treatments worked and Chenchen got discharged finally. According to the follow-up of nutrition department, he is 76 centimeters tall, weighing 11 kilograms, and has normal nutrition status for his age of one year old.

In SCMC, there are many children with severe diseases such as Chenchen who have high nutritional requirements. In 2009, the clinical nutrition department was officially opened. Through eight years' exploration, a professional pediatric nutritional support team has been formed: four nutritional doctors are in charge of parenteral nutrition and enteral nutrition, four dietitians are responsible for oral diet, and a technician is responsible for nutritional assessment such as the human body composition testing (muscle, minerals, fats, etc.), bone mineral density detection, nutrition detection and etc.

### **1 RMB's input of nutritional support generates 4 RMB's clinical benefits/outcomes**

In SCMC, not only children like Chenchen but also a lot of infant patients from 0-1-year-olds need nutritional support. How to feed these children and the safe configuration of enteral formula has become the focus of clinical nutrition department's work.

At 2:00 pm, the meal carts full of all kinds of milk were sent out on time. The reporter followed the meal attendant to send milk and discovered that these milks are not the same as the ordinary formula. As Dietitian Zhen Jiaqi introduced, the infant formula prepared by the clinical nutrition department has many formulations: the whole protein formula, hydrolysis formula, deep hydrolysis formula, amino acid formula, special individualized formula and etc. Each formula corresponds to a different disease condition.

For example, for pediatric patients with gastrointestinal dysfunction, dietitians prepare hydrolyzed protein formula to reduce diarrhea and improve immunity. For children who are malnourished, dietitians provide the formula of "whole-protein and high energy density" to supplement their diets. In the configuration room of enteral nutrition, following the doctors' prescription, the kitchen workers prepare nearly 60,000 milliliters of formula milk every day.



*Staff from nutrition department checking patients' diets*

Behind the intensive feeding is a sophisticated clinical nutritional management system. "Information management can improve efficiency and more importantly, it can manage potential patients." Hong Li, director of clinical nutrition department said that the nutrition doctors only involved into the treatment when clinician signed consultation sheets showing that a child needs nutritional support. But in fact, there are about another 75% patients without severe malnutrition have high nutritional risks. In April 2016, SCMC started up the "individualized nutritional screening

assessment information system for oriented clinical decision”. All children must have nutritional risk screening when admitted to hospital and for those with high nutritional risk, the nutrition department will begin consultation actively.

By September of his year, nearly 50,000 pediatric inpatients have accepted the nutritional risk screening, of which 15% of them are with high risk. The nutrition department provided consultation and reasonable nutrition support therapy forwardly. For those high-risk patients with severe illness, the nutrition doctors also make rounds daily and continue to follow up with the patients at outpatient clinics after they discharge.

This information system obtained the national software copyright in October 2016, and SCMC became the first domestic pediatric hospital using the standardized information management system to realize the procedure of “nutritional screening-nutritional assessment-active nutritional consultation and support-nutritional follow up” for all pediatric inpatients. “Although the workload has been increased, we do see the clinical outcomes. The length of stay is shortened, the overall hospitalization cost is reduced as well as the infectious complications,” said Hong Li. “Nutrition support therapy is profitable and effective. An authoritative nutrition study indicated that 1 RMB’s input of nutritional support can generate 4 RMB’s clinical benefits.

### **Doctors teach/coach parents hand by hand how to feed their children**

In order to meet the needs of all patients, there is also a nutrition outpatient service provided at SCMC. The reporter encountered many over-weight children at the clinics. Dr. Hong Li said,” In addition to malnutrition caused by congenital diseases, hematologic tumors, surgeries and allergies, the obesity caused by unhealthy life styles has become one of the major public health problems among urban children. The nutrition clinic receives many overweight children every week.

Yiyi is only 8 years old now, but his weight reaches 56.8 kg. The normal weight range for his age and height is 30-40.6kg. He is in the range of a severe obesity with 160.8% obesity degree. After the examination, the dietitian uses a special food model to do nutrition education. “Many parents don’t know how to balance diets for their children,” said Hong. To solve this problem, the nutrition department has customized a batch of food models in order to help parents and children with nutrition education.

She warns that obesity is not just an excess of fat in the body, but also suggests that there may be a lack of nutrients in children’s body. For example, many obese children are often accompanied with deficiency of micronutrients such as iron, calcium and vitamin D, which can lead to deficiency diseases such as iron deficiency anemia and osteoporosis.

Childhood obesity should not be underestimated. Currently, the proportion of overweight and obese children in Shanghai is about 24%. Obese people are more likely to develop diabetes, lipid deposition syndrome, arthritis, vascular diseases, heart diseases, tumor and so on. In addition to tackling childhood obesity, the SCMC nutrition department is conducting a big data analysis and copying strategies for all children.

“We hope to use the current information system to extract nutritional data and conduct health economic research to highlight the value of nutrition therapy, which ultimately benefits all children and their families.” Hong Li said.

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#### **About the clinical nutrition department of SCMC**

The clinical nutrition department was established in 2007 supported by the Abbott Fund Institute of Nutrition Science (AFINS) Program under the cooperation between Project HOPE, Shanghai Children’s Medical Center and Abbott Fund. The program lasted for seven years and generated remarkable achievements in terms of clinical service, medical teaching and nutrition research. Though the program was completed in 2014, the innovative ideas and practices that were introduced and promoted by the program sustain and demonstrate long term impacts. The trained professionals, the nutritional risk screening tool and the information system continue to serve and benefit patients at this hospital. It proves Project HOPE’s pursuit of a sustainable program to reach long lasting benefits for local people’s health.