Development of YYB in China

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October 10-11, Bangkok

The importance of the nutritional status of the children under 2 in China

The peak stunting prevalence is at 18 and 24 months, and no further changes until 5 years old. It means the critical time is under 24 months.
The nutrition security of children under 24 mo. is the windows of opportunity for nutrition of the whole life course.

Scientific evidences proved

Impact on:
- **Individual**—essence of life (health, capability)
- **Family**—The happiness and prosperous
- **Society**—The quality human resources and development

**Solution**—Realistic proceeding from reality

**Current situation**
- Conditions
  - Low purchasing power
  - Using available resources – staple
  - Time is limited
  - No processing facilities
- Operation
  - Poor nutrition knowledge, not improving in a short run
  - Nutritious food—complex practice
  - Nutrition rules are hard to remember

**What is the solution?**
- Conditions
  - Reducing cost, with basic nutritional needs,
  - Keep usual complementary feeding + supplement
  - Time saving—one action—open and pour
  - No facilitate needed
- Public information but no waiting for fully understanding
- Reducing procedure—home fortification
- Simple memory—"a pack per day"

Study on nutrients dense supplement food for complementary feeding for children>6 months of age —

Conventional complementary foods plus single-dose sachet per day to provide young children with the basic nutrition need.
Phase I: Observation study on the effectiveness of YingYangBao (2001-2003) and extended to 2010 in 5 poor counties in Gansu

1500 infants from 5 poor counties in Gansu province, aged 4-12 mo, divided into two groups, feed with F-1 high dose VA every 6 mo. and F-2 for two years. Development of body and cognition, Hb, emotion, communication etc. were observed each year until 2010 and the results showed that benefit of F-1 on infants was significant. This study suggested that Yingyang Bao (YYB) as F-1 can be an effective way to improve the nutrition quality of complimentary food. YYB was then considered an approach to combat infant malnutrition, especially in poor regions.

The analysis showed that the cost-benefit was 1:15 in Gansu province.

<table>
<thead>
<tr>
<th>Two formulations</th>
<th>F-1</th>
<th>F-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>44 kcal</td>
<td>44 kcal</td>
</tr>
<tr>
<td>Protein</td>
<td>3.9 g</td>
<td>--</td>
</tr>
<tr>
<td>Ca</td>
<td>385 mg</td>
<td>--</td>
</tr>
<tr>
<td>VD</td>
<td>280 IU</td>
<td>--</td>
</tr>
<tr>
<td>VB2</td>
<td>0.2 mg</td>
<td>--</td>
</tr>
<tr>
<td>Iron</td>
<td>6.0 mg</td>
<td>--</td>
</tr>
<tr>
<td>Zinc</td>
<td>4.1 mg</td>
<td>--</td>
</tr>
</tbody>
</table>

The analysis showed that the cost-benefit was 1:15 in Gansu province.

Physical growth
The changes of height-for-age z-score and weight-for-age z-score (from baseline to 24 months)

<table>
<thead>
<tr>
<th>Effect Size</th>
<th>Height-for-age z-score</th>
<th>Weight-for-age z-score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.20*</td>
<td>0.15*</td>
</tr>
</tbody>
</table>

*P<0.05. Baseline children include normal and malnourished children.

The average height of children at 24 months is 1.3 cm higher.

* P<0.05. The improvement of height-for-age in YingYangBao group is better than rice flour group.
Differences in Developmental
Comparison of Development Quotient (DQ) and Intelligence Quotient (IQ) after finishing intervention at age of 24 months

IQ at age of 8-9

IQ at 5-6 years

24 months, 3-4 years, 4-6 years
Improvement of anemia prevalence

Anemia prevalence reduced

Distribution curve of hemoglobin

Phase II: The application of YingYangBao and the draft of the standards (2007-March, 2009)

- In 2007, the achievements of YingYangBao in China gained international recognition at the Workshop on Nutrients Requirements and Food Supplements of Young Children

- In 2008, 6 months later of Wenchuan earthquake, YingYangBao intervention was carried out at Beichuan county, Li xian county and Mao county which benefited more than 6000 children at 6-24 months (under the support of UNICEF and GAIN).

- Related regulatory activities of YingYangBao have been initiated, and ILSI FP China and China CDC jointly drafted the food hygiene standards of YYB
Standard of YYB

General standard for complementary food supplements
GB 22570–2008

Protein based MNP(YYB)
Tablets
MNP
Spread

YYB products
<table>
<thead>
<tr>
<th>Projects</th>
<th>Regions</th>
<th>Implement departments and partners</th>
<th>Organizations/ Funding agencies</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Products of YYB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Nutrition Intervention on 6-24 Months Infants
2008-2012. Organized by Ministry of Health. Supported by GAIN, UNICEF, US CDC and ILSI. China CDC, Local CDC and Local MCH conducted the project. YYB was distributed free to the families and health and feeding education conducted in the same period.

YYB formula (GB / T 22570-2008)

<table>
<thead>
<tr>
<th>(12 g/sachet)</th>
<th>protein</th>
<th>iron (mg)</th>
<th>zinc (mg)</th>
<th>calcium (mg)</th>
<th>VA (µg)</th>
<th>VD (µg)</th>
<th>VB₁ (mg)</th>
<th>VB₂ (mg)</th>
<th>VB₁₂ (µg)</th>
<th>FA (µg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>7.5</td>
<td>5</td>
<td>200</td>
<td>250</td>
<td>5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>75</td>
</tr>
</tbody>
</table>

YYB coverage and compliance

<table>
<thead>
<tr>
<th></th>
<th>6 mo</th>
<th>12 mo</th>
<th>18 mo</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>coverage,%</td>
<td>94.2</td>
<td>93.8</td>
<td>94.1</td>
<td>NS</td>
</tr>
<tr>
<td>compliance,%</td>
<td>98.3</td>
<td>98.5</td>
<td>98.3</td>
<td>NS</td>
</tr>
<tr>
<td>Average consumption in past 2 weeks, sachet</td>
<td>5.3</td>
<td>5.1</td>
<td>4.7</td>
<td>0.08</td>
</tr>
</tbody>
</table>

9,996,030 YYB sachets was distributed and 27,872 6-24 month infants were feed with YYB.
Survey

- PPS method was used for sampling of the infants.
- Height, weight, Hb were measured.
- Rickets, angular stomatitis and glossitis was diagnosed by doctors from local hospitals.
- General family information was collected.
- Feeding practice was collected by questionnaires.

General information of surveyed infants

- Total surveyed numbers of infants were 4517;
- Percentages of male and female were 52.1% and 47.9%;
- Percents of 6-11 mo, 12-17 mo, 18-23mo were 27.5%, 38.9% and 33.6% respectively.

General information of the surveyed infants

<table>
<thead>
<tr>
<th></th>
<th>0-m</th>
<th>6-m</th>
<th>12-m</th>
<th>18-m</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numbers of surveyed infants</td>
<td>1290</td>
<td>1142</td>
<td>1118</td>
<td>1040</td>
<td></td>
</tr>
<tr>
<td>Average age, month</td>
<td>14.0</td>
<td>15.3</td>
<td>16.0</td>
<td>16.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Average weight, grams</td>
<td>3283</td>
<td>3304</td>
<td>3286</td>
<td>3174</td>
<td>NS</td>
</tr>
<tr>
<td>Low birth weight. &lt;2500 grams</td>
<td>5.0%</td>
<td>4.4%</td>
<td>7.1%</td>
<td>4.3%</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Different aged groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-11 months</td>
<td>37.0%</td>
<td>26.6%</td>
<td>23.6%</td>
<td>22.7%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>12-17 months</td>
<td>38.9%</td>
<td>40.6%</td>
<td>37.3%</td>
<td>39.2%</td>
<td>NS</td>
</tr>
<tr>
<td>18-23 months</td>
<td>24.1%</td>
<td>32.8%</td>
<td>39.0%</td>
<td>38.1%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male, Boy</td>
<td>48.8%</td>
<td>49.4%</td>
<td>48.6%</td>
<td>44.4%</td>
<td></td>
</tr>
<tr>
<td>female, Girl</td>
<td>51.2%</td>
<td>50.6%</td>
<td>51.4%</td>
<td>55.6%</td>
<td></td>
</tr>
</tbody>
</table>
Distribution of Hb changed and anemia rate decreased significantly after 18 mo intervention.

<table>
<thead>
<tr>
<th>Hemoglobin concentration (g/dl)</th>
<th>Percent of children</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Baseline survey</td>
<td></td>
</tr>
<tr>
<td>6-month survey</td>
<td></td>
</tr>
<tr>
<td>12-month survey</td>
<td></td>
</tr>
<tr>
<td>18-month survey</td>
<td></td>
</tr>
</tbody>
</table>

Baseline survey average hemoglobin level (g/dl) 10.8, 6-month survey 12.3, 12-month survey 11.6, 18-month survey 11.7, p < 0.001

Prevalence of anemia, %

<table>
<thead>
<tr>
<th>Type</th>
<th>0-m</th>
<th>6-m</th>
<th>12-m</th>
<th>18-m</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe</td>
<td>0%</td>
<td>0.2%</td>
<td>0%</td>
<td>0.1%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Moderate</td>
<td>7.5%</td>
<td>7.5%</td>
<td>5.8%</td>
<td>7.3%</td>
<td></td>
</tr>
<tr>
<td>Mild</td>
<td>29.0%</td>
<td>16.7%</td>
<td>18.1%</td>
<td>15.4%</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>50.5%</td>
<td>75.8%</td>
<td>76.0%</td>
<td>77.1%</td>
<td></td>
</tr>
</tbody>
</table>

Anemia rates decreased at 6-m, 12-m, 18-m compared with that of the baseline. Average anemia rate decreased from 52.8% to 24.8%. The dropped rate reached 53%.
Phase III: The application of YingYangBao and the process of scaling up (March, 2009 – 2012)

- The development pushing work forward leading to the formation of a policy;
  Technology sectors—providing scientific information for the scaled-up application of YingYangBao obtaining scientific evidence from the practice;
  Government—Deep concerns from Professional departments
  Foundations/civil societies—Supports and project practices of all sectors of society;
  Industry—positively involving in the project of YingYangBao to support the scaling up of YYB application.

Enterprises have been involved in:
- public donations,
- cost reduction (without considering the profit at the beginning)
- improvement of the taste and quality of the product.
• **2010-2012**, more than 30,000 children in 8 earthquake attacked counties among 3 provinces were intervened for 18 months with monitoring and effect evaluation.

• **2011-2013**, All China Women’s Federation and Ministry of Health jointly launched an action to eliminate preschooler anemia by providing sprinkles. The action has been carried out in 67 counties across 20 provinces, benefiting about 460,000 children. The initial monitoring were recorded.

• In **2012**, based on the achievement in social equity pilot, Qinghai Provincial government scaled up early child development program in 15 counties, providing YYB and village kindergartens free, which has been launched in **2013**.

• **Application of YYB using various models with different targets**
  - Social marketing Model, NutriGo project in Hubei and Anhui – For sustainable development purpose, free and low-cost purchasing service were tried.
  - **Low cost + cost purchasing the services** – to see the sustainability and high coverage.
  - **Mechanism of YYB distribution at the community** – For efficient distribution, with high coverage in 1648 villages, distribution routes were recorded in details.

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**The beginning and prospects of the policy formulation of nutritional security for early childhood**

• **2012-2013**, Ministry of Health and Ministry of Finance invested RMB 100 million Yuan on the program among 100 poor counties in 10 provinces offering YingYangBao (1 sachet/day/person) for almost 270,000 children age 6-24mons, which had been initiated in October, 2012.

• This program is planning to be sustainably developed after 2013 to benefit overall(699) poor counties.
Early Children Nutrition Improvement Projects in Poverty Regions

- MOH and All-China Women’s Federation Organize the project.
- Target: Improve nutrition and health in poor rural regions through distribution of YYB to 6-24 months early children for free by government and knowledge of infant care and feeding.

Project frame work

- MOH
- ACWF
- Dept. of WCH, MOH
- MCH, China CDC
- PDOH and PWF
- CDOH and CWF
- INFS, China CDC
- MOH and WF
- Village doctors
- 6-24 mo. infants
什么是营养包

是专门为6个月到3岁的
小宝宝添加营养

出来的。由中国妇联回家

卫生部中国

儿童营养

学会制定

配方

不贫血！

长得快！
天天都吃营养包，宝宝聪明疾病少。
It is valuable to work hard to improve the infants nutrition and health!