THE LADDOO PROJECT

(Report by Jaskeerat Bedi, Design Impact Fellow
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ABOUT MALNUTRITION

"Poverty is NOT the root cause of malnutrition.

Neither is having low disposable income. It is more often inadequate knowledge about feeding practices that are in the best interests of growing child, (especially between 6-18 months) that causes malnutrition. As A.K Shiva Kumar\(^1\) writes, “The denial of as little as 200-300 calories in a young child’s daily diet is what makes the difference between the normal growth and the faltering that starts the descent towards illness and death.”

ABOUT THE LADDOO PROJECT

Deep Griha Society (Pune, India) in collaboration with Design Impact (Cincinnati, Ohio) has developed special nutrition snack rich in Iron and Protein. The recipe is an innovative product, that acts like a nutrition food supplement, when given regularly to the children, shows positive impact in their growth & reduces anemia.

These laddoo are specially effective if given between the growing age of 6 months to 5 yrs. These laddoo are easy to make & are sourced from indigenous raw materials.

ABOUT DEEP GRIHA SOCIETY

Deep Griha Society (DGS) has been working since 1975 in Welfare development activities, serving the impoverished Communities of Tadiwala Road, Ramtekdi, and Bibvewadi in Pune.

Founded by Dr. Neela Onawale, DGS is an independent Charitable organization that is catering to many welfare Development activities in – Child care, child empowerment, youth empowerment, Women empowerment, medical & health care, Disha (HIV / AIDS awareness) and rural empowerment.

The mission of DGS is to enable “Empowerment of the marginalized through capacity building and sustainable Urban and rural development programmes”

\(^1\) A.K. Shiva Kumar, a development economist, is a consultant with UNICEF.
IMPLEMENTING THE PROJECT

The project has been executed in a three step process - Research, Prototype and Analysis

- **Research**
  - Identified root cause of Malnutrition based on dietary food intake of children. *(Deficiency of Protein & Iron)*
  - Developed special nutrition rich recipe aimed especially towards children

- **Prototype**
  - Created Healthy and cost effective laddos that can be made from locally sourced material
  - Conducted a *Randomized Control Test* of the laddos on children between the age group of 6 months to 5 yrs, for time duration of 6 months

- **Analysis**
  - Conducted *Nutrition Analysis of Laddos* by certified Food Testing Lab *(NAFARI)*
  - Took periodic measurements of children's height, weight and Hb

Image 01: describes the process being followed to execute the Laddoo Project at DGS

After successfully developing Nutritious Laddos, they were made a part of the meal given to children at DGS crèches. The nutrition supplement has been given to all children free of cost since May 2012.

In order to successfully run the project, it was extremely important to measure its impact. In order to assess the impact of the nutritious Laddos, a child health nutrition survey was conducted.

**CHILD HEALTH NUTRITION SURVEY**

The goal of this survey is to assess whether the Ladoos provided to the children in creches tend to increase their health or not.

The Ladoos are part of the diet since May 2012, starting time of the survey. Measurements of children have been taken every three months, till January 2013. Hence the duration of the survey is 8 months (It usually takes 6 months for food supplement to show results in a child's health). 68 children from three centres of DGS were continuously given the laddos through out this time duration. Bibvewadi:16 ; Ramtekadi:15 ; Tadiwala :37

Of which 37 are boys, 31 are girls.
## DATA | SURVEY

**May 12**

<table>
<thead>
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<th></th>
<th>Age</th>
<th>Weight</th>
<th>Height</th>
<th>BMI</th>
<th>WAZ</th>
<th>HAZ</th>
<th>BAZ</th>
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</thead>
<tbody>
<tr>
<td>Min</td>
<td>13.50</td>
<td>7.67</td>
<td>63.30</td>
<td>11.00</td>
<td>-4.280</td>
<td>-6.39</td>
<td>-4.180</td>
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<tr>
<td>Median</td>
<td>39.44</td>
<td>11.50</td>
<td>88.43</td>
<td>14.30</td>
<td>-1.920</td>
<td>-2.32</td>
<td>-0.855</td>
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<tr>
<td>Mean</td>
<td>39.68</td>
<td>11.65</td>
<td>89.20</td>
<td>14.65</td>
<td>-1.950</td>
<td>-2.13</td>
<td>-0.844</td>
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<tr>
<td>Max</td>
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<td>16.90</td>
<td>106.57</td>
<td>21.90</td>
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<td>1.65</td>
<td>4.170</td>
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**Jan 13**

<table>
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<tr>
<th></th>
<th>Age</th>
<th>Weight</th>
<th>Height</th>
<th>BMI</th>
<th>WAZ</th>
<th>HAZ</th>
<th>BAZ</th>
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</thead>
<tbody>
<tr>
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<td>65.00</td>
<td>10.40</td>
<td>-4.250</td>
<td>-8.650</td>
<td>-5.440</td>
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<tr>
<td>Median</td>
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<td>-1.070</td>
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<td>94.41</td>
<td>14.45</td>
<td>-1.755</td>
<td>-1.701</td>
<td>-0.934</td>
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<tr>
<td>Max</td>
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<td>18.10</td>
<td>112.90</td>
<td>28.40</td>
<td>0.450</td>
<td>2.320</td>
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Note from Anthroplus manual: Minimum plausible:
- WAZ [-6 ; 5]
- HAZ [-6 ; 6]
- BAZ [-5 ; 5]

⇒ Measures in red will be removed for the analysis (=> ID 6, 39, 41, 67).
RESULTS | Child Health Nutritional Survey

**Results - Malnutrition**
68 children were continuously given laddoo’s during May 2012 to Jan 2013
37 boys 31 girls

42% increase of children whose weight-to-age ratio has improved from -2.5 SD to -1.7 SD

**Results - Stuntedness**
68 children were continuously given laddoo’s during May 2012 to Jan 2013
37 boys 31 girls

53.7% increase of children whose height-to-age ratio has improved from -3 SD to -1.8 SD

Project Report: The Laddoo Project
HEALTH BENEFITS

1. Rich source of vitamin E, essential for immune system function
2. Contains some of the healthiest fats, carbohydrates & proteins
3. Contains anti-cancerous agents
4. Rich intake of whole wheat is significantly linked to lowering the risk of wheezing & asthma in children
5. Rich source of calcium, beneficial for maintaining bones & preventing disorder related to weak bones and teeth
6. Good source of dietary protein that composes fine quality amino acids that are essential for growth and development
7. Rich in Omega-3 fatty acids, important for conditions like asthma, osteoarthritis, rheumatoid arthritis,
8. Help diabetic patients in responding better to insulin and absorption of Glucose effectively
9. Great substitute for fish oil

HIGHLIGHTS | THE LADDO PROJECT

1. 300 + children in DGS are being benefited by the Healthy Laddoos
2. 50 % children who have been given laddoos continuously over span of 6 months have shown improvement from
   -3 SD to > -2 SD
3. Significant increase in their Hemoglobin
4. Better digestive systems
5. Visible better health and active behavior in the crèches
INGREDIENTS

COCONUT + WHITE MILLET LADDO

Ingredients- Wheat flour (187.5 grams), White millet flour (187.5 grams), Desiccated coconut (125 grams), Flax seed (125 grams), Ghee (50 grams (2 tablespoons)), Jaggery (350 grams), Cardamom (2.5 grams (7-8 pods)), Milk (warmed) {250 milliliters (~ 0.75 cup)}

NUTRITION ANALYSIS

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<thead>
<tr>
<th>s.no</th>
<th>Parameter</th>
<th>Result</th>
<th>Unit</th>
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<td>Energy Value</td>
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<td>Kcal/ 100g</td>
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<tr>
<td>2</td>
<td>Protein</td>
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<td>g/ 100 g</td>
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<tr>
<td>3</td>
<td>Carbohydrate</td>
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<tr>
<td>4</td>
<td>Fat</td>
<td>16.1</td>
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<td>5</td>
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<tr>
<td>6</td>
<td>Iron</td>
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<td>Mg/ 100g</td>
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PEANUT LADDO

Ingredients- Wheat flour (375 grams), Sesame seeds (125 grams), Peanuts (150 grams), Ghee (50 grams (2 tablespoons)), Jaggery (375 grams), Cardamom (2.5 grams (7-8 pods)), Milk (warmed) {250 milliliters (~ 0.75 cup)}

NUTRITION ANALYSIS

<table>
<thead>
<tr>
<th>s.no</th>
<th>Parameter</th>
<th>Result</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Energy Value</td>
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<td>Kcal/ 100g</td>
</tr>
<tr>
<td>2</td>
<td>Protein</td>
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<td>g/ 100 g</td>
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<tr>
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<td>5</td>
<td>Sugar as Sucrose</td>
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<tr>
<td>6</td>
<td>Iron</td>
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<td>Mg/ 100g</td>
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