

Feeding the future

Impact evaluation of consuming fortified rice on nutritional indicators in school children of Karnataka

Background

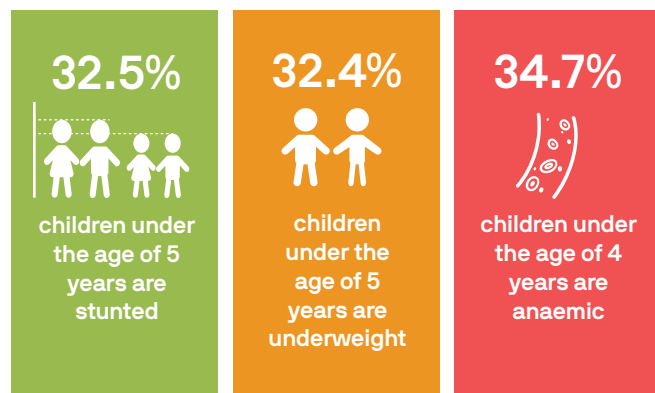
An estimated 2 billion people worldwide suffer from vitamin and mineral deficiencies. The country with the highest burden is India. Iron deficiency anaemia, vitamin A deficiency, and iodine deficiency disorders are prevalent throughout India. Anaemia, primarily caused by iron deficiency, occurs across communities, income brackets, and age groups. An estimated 40 percent of children between 1 to 4 years¹, 53 percent of women between 15 and 49 years, and 23 percent Indian men are anaemic².

Research highlights that Indian children are among the worst sufferers of malnutrition that includes vitamin and mineral deficiencies. This affects their overall development as they easily succumb to physical, mental and emotional issues. While many approaches have been identified, food fortification has proved to be the most effective intervention to deliver vitamin and mineral rich food to a large population. Food fortification involves adding minute quantities of nutrients, such as iron, folic acid, vitamin A, iodine, to commonly consumed foods, including rice, wheat flour, oil, salt and milk.

PATH collaborated with the Government of Karnataka, Akshaya Patra, Karuna Trust and Sight and Life to increase the spread of fortified rice under the Mid Day Meal (MDM) scheme across five districts of Karnataka. A total of 450,000 children were fed fortified rice (Iron, Folic Acid, Vitamin B12, Vitamin A, Thiamin, Niacin, Vitamin B6) through the school meal programme in 2600 schools in the districts of Mysore, Mangalore, Bangalore, Bellary and Hubli in Karnataka.

The programme educated children and parents on the relevance of nutrition, clean drinking water, sanitation,

Malnutrition in Karnataka



Fortified rice kernels. Photo: PATH

hygiene, and good health as these are direct influencers of well-being. Schools were also influenced to have effective deworming programmes.

Objective

PATH commissioned a longitudinal study to assess the impact of consumption of fortified rice on nutritional and health indicators among school children in government schools of Karnataka.

The primary objective of the study was to measure the effectiveness of the intervention on nutritional status viz stunting (height for age), underweight (weight for age), and wasting (BMI for age) as well as morbidity profile i.e. frequency of fever, diarrhoea, and malaria.

The study also measured the effect of the intervention on school attendance and absenteeism, cognitive ability, health and hygiene behaviour of the children. These indicators were used to check for any improvement in children's health and overall development. However, the study did not look at the micronutrient status or anaemia as enough data already exists on its efficacy.

1 Comprehensive National Nutrition Survey India Factsheet, 2016-2018. New Delhi: Ministry of Health and Family Welfare, Government Of India.

2 National Family Health Survey 4, 2015-16. New Delhi: Ministry of Health and Family Welfare, Government Of India.

Approach

Study design and locale: A longitudinal cohort study design was adopted to assess the effectiveness of fortified rice intervention in the selected districts of Karnataka.

Sampling technique: Two stage sampling technique was adopted to select required number of children in each cohort. At the first stage 50 schools were selected by using probability proportion to size. At the second stage 40 children (8 from each class I to Class V) were randomly assigned to 5 different class specific cohorts.

Data collection points: Quantitative data through semi-structure questionnaire were collected at three different points within the intervention duration.

	Timelines	No. of children
First measurement (Baseline)	January to March 2016	1988
Second measurement (Midline)	July to September 2017	1736
Third measurement (Endline)	January to March 2018	1692
Cohort (Number of Students who participated in all 3 rounds)		1661

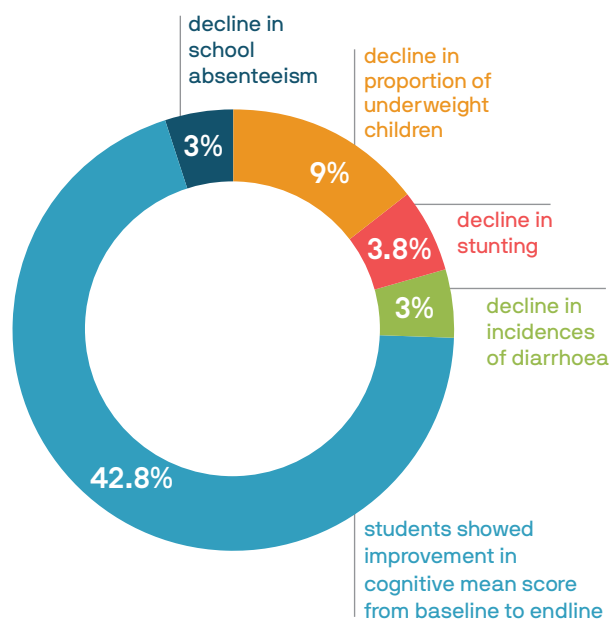
The study analysed information and data received from three main stakeholders of the initiative:

- Students:** general information, attendance record, anthropometric measurements, cognitive score sheets (Grade 2-6)

- Parents:** socio-economic profile, knowledge, attitudes, beliefs, and practices (KABP) on issues such as nutrition, health, dietary intake.

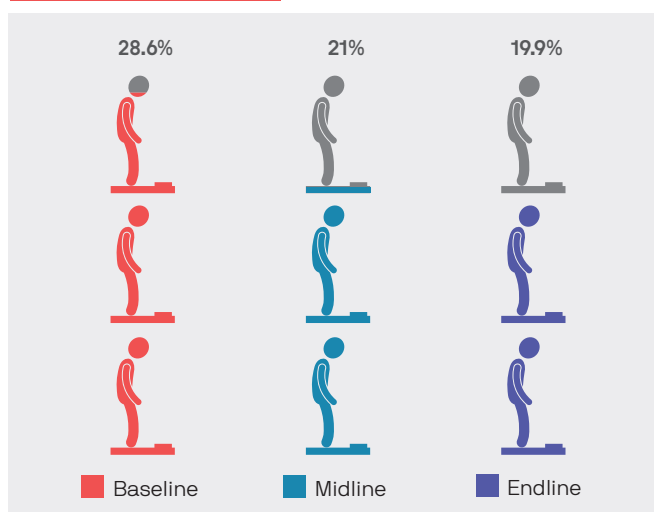
- Teachers:** school infrastructure checklist, teacher awareness and knowledge on mid-day meals, nutrition, health, among others

Key Findings

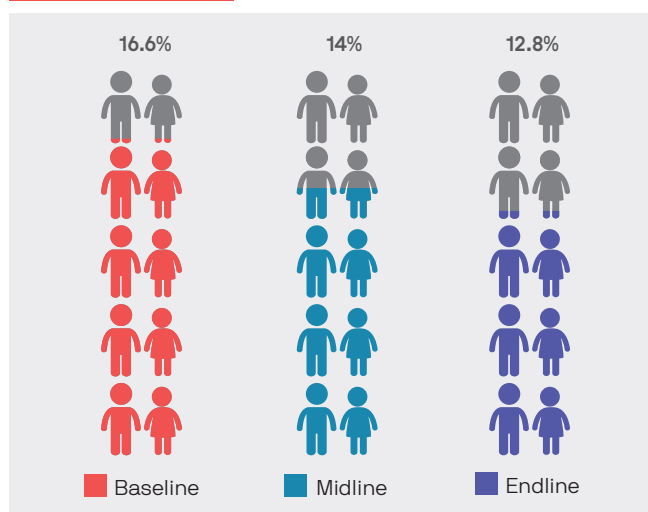


Improved physical growth in children: The anthropometric indicators have significantly improved from start of the study (baseline) to end of the study (endline). Overall 9% reduction in underweight and 3.8% decrease in stunting amongst students was observed.

Impact on underweight

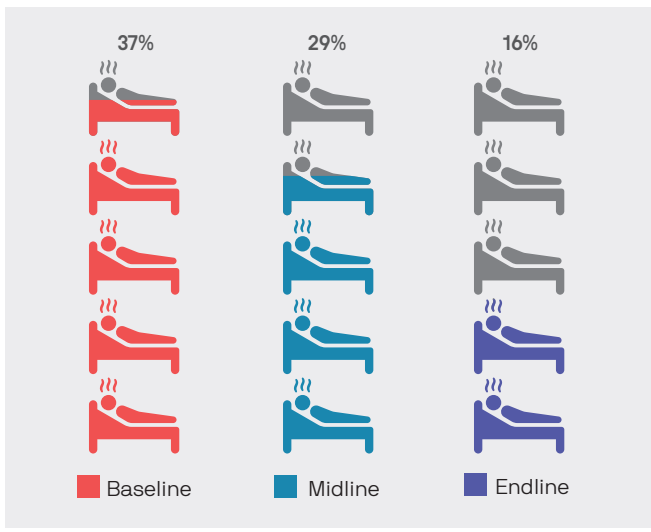


Impact on stunting



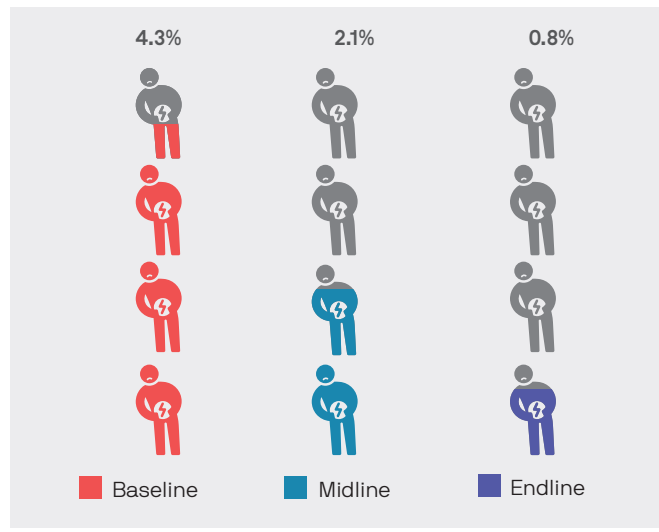
Less children falling sick: Children falling sick has decreased from 37% to 16%.

Impact on sickness



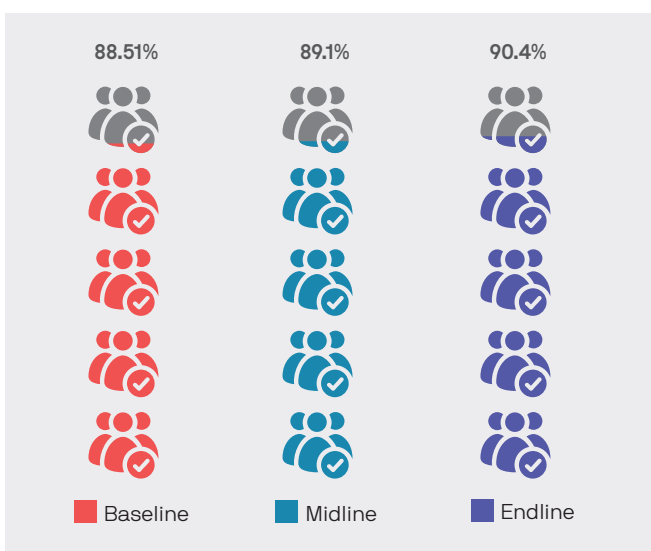
Decrease in diarrhoea: There is an overall decrease in diarrhoeal instances from 4.33% in baseline to 0.83% in endline.

Impact on diarrhoea



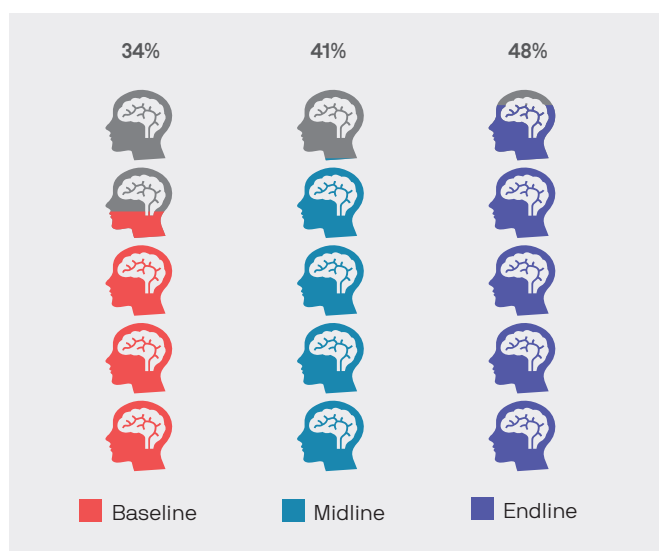
Increase in attendance: The average rate has increased from 88.51% at baseline to 90.40% at endline.

Impact on attendance



Improved cognitive development: The average combined score in Math and English has improved from 34% from baseline to endline.

Impact on cognitive score



Conclusion

Based on the findings, it can be concluded that the rice fortification initiative under the Midday Meal scheme has contributed in reducing malnutrition and morbidity rates and improving the cognitive ability of the students. An increasing trend was observed in all key outcome indicators such as stunting, underweight, morbidity, attendance and cognitive performance of students. Thus, fortified rice intervention has proved to be an effective tool in providing micronutrients to school going children and enhancing their nutritional and cognitive status.

Based on the success of the program in Karnataka, the government has proposed scale up of fortified rice with PATH as a technical partner in four additional districts of the state which will reach an estimated 1 million children. The project in Karnataka has now become sustainable.

The Government of India also plans to scale fortified rice by including it in its various safety net schemes including Integrated Child Development Services (ICDS), and Public Distribution System (PDS) in addition to Midday Meal (MDM). It has already become a part of government's Poshan and Anaemia Mukht Abhiyan.

To address the issue of malnutrition, PATH continues to support the government to bring fortified rice into these schemes across all parts of the country. This is accomplished by Government of India and PATH's multipronged approach which includes improved dietary diversification, fortification, deworming medicines, and improved water, sanitation, and hygiene infrastructure and behaviours.



Students eating fortified rice as part of a Mid-day Meal Program at a government school in Bengaluru, India.

Photo: PATH/Anil Cherukupalli

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