School age children across the globe suffer from micronutrient malnutrition. Nutritional deprivation during the school aged years can constrain their physical and cognitive development, possibly limiting their educational achievement and attenuating the impact of educational interventions for social development. To tackle the problem of micronutrient malnutrition, Government of India is running the mid day meal programmes in schools. Various innovations are adopted to strengthen the programme for its effective delivery. One such innovation in delivery of MDM is through partnership with various NGOs, one of it being The Akshay Patra Foundation. In Vadodara, the Akshay Patra Foundation was made operational from 5th November'2009 with the help of 3 industries namely GACL, GSFC, and GIPCL. The present study was undertaken to assess the nutritional status of primary school children of urban vadodara and to monitor the impact of school meals provided by TAPF on nutritional status of school children.

The study was carried out in 5 phases. Phase 1 was a cross sectional study wherein anthropometric measurements, socio-economic status, morbidity profile and haemoglobin levels were assessed. Phase 2 comprised of process evaluation of the MDM programme both at centralized kitchen as well as at schools. In Phase 3, impact evaluation of the NGO intervention was carried out after a period of one year. Phase 4 comprised of capacity building to Municipal schools teachers of urban Vadodara and in the last phase 5, KAP of parents, teachers and children were assessed regarding MDM provided by NGO TAPF.

The formative research was carried on children studying from 1-7th standard in 16 schools of urban Vadodara. In all 6574 children were enrolled out of which data was obtained from 4905 children. Thus, 23% absenteeism was seen in the schools. Equal proportion of boys (n=2365) and girls (n=2540) were covered under the study. The results revealed a high prevalence of undernutrition in the form of underweight (54%), stunting (38%) and thinness (33%) respectively. Gender wise the prevalence of underweight and thinness was more among boys. Conversely higher prevalence of stunting was seen among girls. Age wise the maximum prevalence of all the three anthropometric indices was at 10 years of age. According to WHO classification which is age and gender specific, the overall prevalence of anaemia was 90% of which 12.9% were mild anaemic, 74.1% were moderately anaemic and 3% were

severely anaemic. The prevalence of anaemia was more among girls as compared to the boys and among younger age group i.e. children < 11 years of age. However, the prevalence of severe anaemia was high among girls >12 years of age.

Composite Index of Anthropometric Failure (CIAF) which is a single aggregate indicator used for a comprehensive measurement of overall prevalence of undernutrition, which would incorporate all undernourished children was assessed. In the present study, about 2/3rd of the children were in a state of anthropometric failure and 15% of children were underweight, stunted, and thin. Overall Anthropometric failure was more in boys and age wise highest prevalence was seen at 10 years of age.

Process evaluation alongside the intervention of MDM by an NGO was evaluated to identify how the intervention was implemented in practice. The centralized kitchen evaluation revealed that TAPF had better infrastructure, machinery, storage facility and man power. Good food handling practices, sanitation and hygiene practices were followed by the employees at TAPF. They had insulated vans for transporting hot, nutritious cooked meals to various schools.

The execution of MDMP at schools revealed that the mean nutrient intake of the children was less than 1/3rd of the RDA as well as nutritional norms prescribed under MDM. Gender wise mean nutrient intake was higher among boys as compared to the girls. While, standard wise children of upper primary (6th – 7th) had higher mean nutrient intake as compared to the primary (1st – 5th). About 73% of the children consumed MDM against total number of children present. Reasons for low consumption could be lack of motivation by the teachers to consume MDM. Spot observations also revealed that sanitation and hygiene practices of the children were poor.

The results of the impact evaluation phase revealed that there was significant increase in mean weight, height and BMI of the children. The impact of MDM was better among girls as compared to the boys. The prevalence of underweight, stunting and thinness was reduced by 6.7%, 3.1% and 4% respectively. Thus, an overall 7.1% reduction was seen in the state of anthropometric failure. The prevalence of

anaemia was reduced from 90% to 62.5%, with an overall 27.5% reduction in the prevalence of anaemia. The reduction in the prevalence could be attributed to fortified wheat flour provided by the Government of Gujarat. The impact of MDM provided by TAPF also showed significant increase in the mean attendance of the children even among severely thin children also. Scholastic performance of the children was improved significantly.

As meagre motivation by the teachers was observed during process evaluation at schools, and therefore a need was felt for capacity building of the teachers for effective functioning of MDMP. The findings of the workshop revealed that majority of the teachers were not aware of the objectives of MDMP. Only 12% of the teachers reported problems in implementing MDMP which were mainly related to infrastructure facilities and monitoring registers. When inquired about their preferences for cooking, majority of them preferred meals supplied by TAPF as quality of food and hygiene is maintained. They also reported improvement observed by them in the objectives of MDM such as increase in attendance especially girl child, increase in girl child enrolment and improvement in school performance.

In the last phase, perceptions of teachers, children and parents were assessed regarding MDM provided by TAPF. The findings of this phase revealed that majority of the teachers felt there was improvement in the nutritional status of school children. All the children liked the meals provided by TAPF mainly Dal, Rice and Sukhadi. Suggestions given by teachers and parents were to add variety to the menu and inclusion of seasonal fruits and sweets on occasion. Thus, overall the results highlights that teachers, parents and children were satisfied with meals delivered by TAPF and promotes such models especially in urban areas where space is a constrain for cooking meals.