

Abstract

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Malnutrition remains the world's most serious health problem. Prevalence of underweight among children in India is amongst the highest in the world. Childhood is a period of rapid physical and mental growth. Micronutrient deficiencies like anemia are highly prevalent in this age group and have dire consequences. To tackle the problem of macro and micronutrient deficiencies, Government of India is running the mid day meal schemes in schools. The evaluation of the scheme running for more than a decade is also important.

Thus the study was planned with the broad objective of assessing the prevalence of malnutrition and Iron Deficiency Anaemia in the rural school children of Vadodara. The mid day meal consumption pattern was also elicited. The impact of weekly Iron Folic Acid and deworming supplements on anthropometric indices, haemoglobin status and physical work capacity was also studied. Growth monitoring was also tracked for three years.

The study was conducted in the rural petrochemical area of Vadodara. Out of 45 schools in the area, 6 schools were randomly selected from each zone. All the children from 1st to 7th standard were enrolled for the study. A total of 3170 children registered for the study. There was 28 % of absenteeism rate in rural area so the data was collected on 2282 children. Haemoglobin estimation was done on 865 children.

The prevalence of malnutrition was estimated using both the CDC 2000 and WHO 2007 standards. The prevalence of underweight was 70 % according to CDC 2000 and 64 % by WHO 2007 standards. The prevalence of stunting was 31 %. The prevalence of thinness was 60 %. MDM consumption ranged from 52.8 % - 63.6 %. Weekly consumption pattern varied from 58 % to 74 % according to likes and dislikes of children. The mean haemoglobin levels of children were 11.3 ± 1.4 g in children. It was seen that 72 % of the children were anemic of which 57.6 % were in mild category and 14.2 % in moderate category.

Phase 2 was a longitudinal study in which 3 schools were randomly selected and growth monitoring was done continuously for 3 years. A total of 465 children had 3 pair of data for consecutive 3 years. The interval between each survey was one year. The prevalence of underweight, stunting and thinness was 64.3 %, 10.7 % and 62.7 % according to WHO 2007 classification. The mean increase in weight per year for children ranged from 2.7- 2.8 Kg. The increase in height per year ranged from 6.1 Cm – 6 cm. During the study period of two years, the underweight population contracted by 13 %.

Phase 3A was intervention research wherein impact of deworming (400 mg Albendazole) alone and deworming (400 mg Albendazole once in 6 month) with weekly IFA supplementation (60 mg Fe + 0.5 mg folic acid for 30 weeks) was seen on growth, haemoglobin status and physical work capacity of children. Before and after the intervention, height and weight, haemoglobin by cyanmet haemoglobin method and physical work capacity by step test were done.

The intervention could not make significant change on the growth profile of the children. There was a significant increase ($p < 0.001$) in the mean haemoglobin levels in IFA+ DW group. Prevalence of IDA was 75 % in the IFA+ DW group, which after intervention remained only 10 %. The major shift was found in the mild category of anemia. There was 17.3 % rise in the haemoglobin level. In the DW supplemented group, haemoglobin remained unaltered. The physical work capacity, as judged by the number of steps was similar before and after intervention.

In phase 3B washout effect of the intervention was studied. No intervention was given for 6 months and sustainability of the IFA supplementation was seen. The sustainable effect of the intervention was not seen with regard to both the growth and haemoglobin status. Haemoglobin sustainability was seen in only 31 % of the children. The prevalence of IDA increased after the washout period and was found to be 90.6%, 69.1%, 91.4% in control, IFA+DW and only DW supplemented group.

The study reflects that prevalence of malnutrition is very high in the rural setup. Malnutrition is coupled with high prevalence of anemia. Mid Day Meal is not consumed regularly, which should be canvassed. Behaviour Change Communication (BCC) and dietary diversification can also prove to be beneficial in long run and should be advocated. With adequate safeguard and proper monitoring, MDM can play a major role in improving the nutritional status of school children. The study reflects that growth monitoring should be a continuous process which would help in identifying growth faltering among children, who may require special attention. The study showed that long term IFA supplementation resulted in significant improvement in the haemoglobin concentration. Thus weekly IFA tablet with one deworming tablet every six month would work wonders for growing children. But the study also proved that the weekly Iron Folic Acid tablet has no sustainable effect. So the IFA supplementation should be a continuous process in schools for the children.