

Impact of Mid Day Meal Scheme on Nutritional Status of Primary School Children in District Deoria

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ABSTRACT

Children are the most vulnerable group that suffers from malnutrition and nutritional deficiency. The research question is- does the mid-day meal scheme have an impact on the nutritional status of school children (7-11 years) in District Deoria ? This was a cross-sectional study conducted at five government primary schools Mid Day Meal (MDM) and five private primary schools Non-Mid Day Meal (NMDM) of rural areas of five block in District Deoria in which children of similar socio-economic status were studied. Simple random sampling was used for selection of children. Study variables taken were height, weight, Body Mass Index (BMI) and clinical assessment. The age of children was found similar at the time of admission and fee structure was found to be almost same in both the schools. Results of the study indicated that the nutritional status of MDM school children was better than NMDM school children but lower than the ICMAR standard. The study reveals good nutritional status of almost Mid Day Meal school children receiving mid day meal (MDM) every day. The study concluded that there was Mid Day Meal scheme better impact on nutritional status of MDM school children in District Deoria.

KEYWORDS : MDM, NMDM, Anthropometric measurements, Body Mass Index (BMI), clinical assessment and Deoria

INTRODUCTION :- The Mid Day Meal Scheme is a multi-faceted programme of the Government of India that, among other things, seeks to address issues of food security, lack of nutrition and access to education on a pan nation scale.[1] It involves provision for free lunch on working days for children in Primary and Upper Primary Classes in various schools run by the government. The primary objective of the scheme is to provide hot cooked meal to children of primary and upper primary classes.[2] It is the world's largest school feeding programme, reaching out to about 120,000,000 children in over 1,265,000 schools and Education Guarantee Scheme (EGS) centres across the country.[5] Its objectives include ; improving nutritional status of children, encouraging poor children, belonging to disadvantaged sections, to attend school more regularly and help them concentrate on classroom activities, thereby increasing the enrollment, retention and attendance rates.[3] A World Bank (2008) report states that India has 42 percent of the world's underweight children. According to the studies by National Nutrition Monitoring Bureau (NNMB), National Institute of Nutrition (NIN) and Indian Council for Medical Research (ICMR), 58.6 percent of the children of the age group 6-9 years and 77.9 percent of the children of the age group 10-13 are underweight. If the mild under nutrition is added to underweight, this number increases to 94.1 percent and 96.4 percent respectively. 30.1 percent of all children of 10-13 age group are severely underweight. The school going age is a dynamic period of a physical growth and development along with mental, emotional and social changes. About 40% of the physical growth and 80% of mental growth is believed to take place during this age. Malnutrition contributes directly or indirectly to more than 60% of 10 million child deaths each year. The poor nutrition status of children is the outcome of trilogy, of poverty ignorance and lack of education. The nutritional status of primary school in Uttar Pradesh state is worst due to prevailing gender biasness. To decrease the incidence of malnutrition among state mid-day meal programme was launched on 15 August, 2004. The menu of mid-day meal in Uttar Pradesh state is based on the locally grown and consumed food according to the local habit of children. Keeping these facts in consideration, the present study has been structured to analyze the health status of primary school children and to find out the impact of mid-day meal on nutritional status of them with following objectives :-

- To determine the anthropometric measurements of MDM and NMDM school children in District Deoria.
- To study the Body Mass Index (BMI) and clinical assessment of MDM and NMDM school children in District Deoria.

MATERIAL AND METHODS :-

Study population – The study was carried out among 250 school children(125 Mid Day Meal (MDM) school children and 125 Non – Mid Day Meal (NMDM) school children) aged 7 to 11 years.

Study area :- To assess the impact of program a set of five schools with Mid Day Meal scheme and five school without Mid Day Meal scheme with comparable socio-economic background were used in five block of Deoria District.

Study design :- A cross sectional and multistage random sampling technique.

Data collection :- By using predesigned and pretested schedule (Interview technique and observation) .

Standards for assessment of nutritional status of Mid Day Meal :

Anthropometry : The following parameters have used for the assessment of nutritional status:-

Height and weight : The anthropometric measurements of standing height of children were taken with their shoes off, standing against measuring tape In a straight posture. A measuring tape was slid, until it that point the highest point of the head. At that point the height of the subjects was recorded in c.m. nearest to 0.1 c.m. A personal weighing machine was used to measure the weight, nearest to 0.5 Kg with minimum clothing and without shoes. Age of the children was recorded as documented in school records. The observed height and weight of children was compared with ICMR standards (2004) the expected computed.

Boby Mass Index : The BMI was calculated using anthropometric measurements (height and weight). The index of nutritional status i.e Body Mass Index and Height for age was expressed in standard deviation units (Z - scores) from reference median as recommended by WHO (1986).

Clinical assessment :- Clinical examination of an individual is the least sensitive method used to evaluate individual's nutritional status. This method of assessment is based on the recognition of certain physical signs believed to be related to inadequate nutrition which can be seen or felt in superficial epithelial tissues especially the eyes, skin or organ near the surface of body. In the present study, observation related to general appearance of child's health, eyes, lips, gums and legs were taken with the help of trained medical practitioner of Primary Health Centre of the selected villages using criteria described by Jelliffe (1966).

Statistical analysis – The data was statistical analysis with help of percentage, mean, t-test and Z-test .

RESULTS AND DISCUSSION :-

Table 1 :- Comparison of mean weight and height of MDM and NMDM school boys with ICMR standard on the basis of age

Age (Years)	Weight (k.g.)										Height (c.m.)									
	MDM Boys					NMDM Boys					MDM Boys					NMDM Boys				
	Obs	Stand-ards	Deficit standard (%)	% Standard	t-test (Sig)	Obs	Stand-ards	Deficit standard (%)	% Standard	t-test (Sig)	Obs	Stand-ards	Deficit standard (%)	% Standard	t-test (Sig)	Obs	Stand-ards	Deficit standard (%)	% Standard	t-test (Sig)
7	19.00	22.90	-3.90(17.03)	82.97	<0.05	17.00	22.90	-5.90(25.76)	74.24	<0.05	118.60	121.70	-3.10(97.45)	97.45	<0.05	113.50	121.70	-8.20(93.26)	93.26	<0.05
8	22.00	25.30	-3.30(13.04)	86.96	NS	19.70	25.30	-5.60(22.13)	77.87	<0.05	126.30	127.00	-0.70(99.45)	99.45	NS	122.70	127.00	-4.30(96.61)	96.61	<0.05
9	21.80	28.10	-6.30(22.42)	77.58	<0.05	19.30	28.10	-8.80(31.32)	68.68	<0.05	126.80	132.20	-5.40(95.92)	95.92	<0.05	124.30	132.20	-7.90(94.02)	94.02	<0.05
10	24.40	31.40	-7.00(22.29)	77.71	<0.05	26.00	31.40	-5.40(17.20)	82.80	<0.05	130.00	137.50	-7.50(94.55)	94.55	<0.05	134.20	137.50	-3.30(97.60)	97.60	NS
11	28.60	32.20	-3.60(11.18)	88.82	<0.05	25.30	32.20	-7.0(21.43)	78.57	<0.05	137.00	140.00	-3.00(97.86)	97.86	NS	132.90	140.00	-7.10(94.93)	94.93	<0.05

<0.05 = Significant at 5% level, NS = Not – Significant, Obs = Observed value, Standard = ICMR standard

The objective was to determine the impact of Mid Day Meal scheme on the nutritional status of school children (7-11 years) in Deoria District .Results on the weight of boys (table ,1) indicated that the weight of MDM and NMDM boys increased with increase in age from 7 to 11 years except age of 8 years in MDM boys and age of 10 years in NMDM boys. The weight in the age group 7 to 11 years ranged from 19 kg to 28.60 kg in MDM boys. In NMDM boys the weight ranged from 17.0 kg to 25.30 kg in both schools boys the weight was found lower than the ICMR standard across all ages.

The height of MDM boys was found shorter than boys of ICMR standard by 0.70 to 7.50 cm across all ages except age of 7 years, 8 and 11 years the maximum difference was found in age group of 10 years. In case of NMDM boys the differences ranges from 3.30 cm to 8.20 cm from 7 to 11 years. Data indicated that the NMDM boys were also found shorter the ICMR standard at all.

Statistically significant difference regarding weight and height between MDM and NMDM boys was observed with the help of 't'-test (P<0.05). Similarly Naik (2005) reported that the mean weight and height of MDM boys and NMDM boys school children in Karnataka were lesser than standards irrespective of gender.

Table 2 :- Comparison of mean weight and height of MDM and NMDM school girls with ICMR standard on the basis of age

Age (Years)	Weight (k.g.)										Height (cm.)									
	MDM Girls					NMDM Girls					MDM Girls					NMDM Girls				
	Obs	Stand-ards	Deficit standard (%)	% Standard	t-test (Sig)	Obs	Stand-ards	Deficit standard (%)	% Standard	t-test (Sig)	Obs	Stand-ards	Deficit standard (%)	% Standard	t-test (Sig)	Obs	Stand-ards	Deficit standard (%)	% Standard	t-test (Sig)
7	16.70	21.80	-5.10(23.38)	76.61	<0.05	16.60	21.80	-5.20(23.85)	76.15	<0.05	118.00	120.60	-1.60(98.67)	98.67	NS	117.30	120.60	-3.30(87.24)	87.24	NS
8	21.50	24.80	-3.30(14.11)	85.89	NS	19.50	24.80	-5.30(21.37)	78.63	<0.05	124.80	126.60	-1.80(98.58)	98.58	NS	120.40	126.60	-6.20(95.10)	95.10	<0.05
9	23.50	28.50	-5.00(18.23)	81.75	<0.05	21.30	28.50	-7.20(25.26)	74.74	<0.05	128.00	132.20	-4.20(95.31)	95.31	<0.05	122.38	132.20	-9.84(92.56)	92.56	<0.05
10	26.60	32.50	-5.90(18.16)	81.85	<0.05	23.50	32.50	-9.00(27.69)	72.31	<0.05	134.90	138.30	-3.40(97.54)	97.54	<0.05	130.70	138.30	-7.60(94.50)	94.50	<0.05
11	26.20	39.70	-7.50(22.26)	77.74	<0.05	24.20	39.70	-15.50(28.19)	71.81	<0.05	138.60	148.00	-9.40(92.61)	92.61	<0.05	136.40	148.00	-11.60(92.18)	92.18	<0.05

<0.05 = Significant at 5% level, NS = Not – Significant, Obs = Observed value, Standard = ICMR standard

It was observed (Table, 2) that the overall weight gain was higher in MDM girls than the NMDM girls but lower than the ICMR standard. Data analysis showed that girls of MDM schools were shorter than the ICMR well to do Indian girls at all ages except at age of 7 and 8 years (higher by 1.60 cm and 1.80 cm, respectively). However in NMDM girls the difference ranges from 3.30 cm to 11.60 cm and the maximum difference was found in age group of 11 years. At the age of 9 and 11 years the of MDM girls was noticed lower than the ICMR standard by 9.84 cm and 11.60 cm respectively. In MDM girls weight ranges from 16.70 kg to 26.20 kg. The mean weight of NMDM school girls in the age group of 7 to 11 years ranges from 16.60 kg to 24.20 kg. Statistically significant differences was found between weight and height of MDM and NMDM girls (p<0.05). Bharati et al.(2005), reveals the same observed in which the mean weight and height of MDM girls and NMDM girls school children aged 7 to 12 years in U.P. was significantly lower than standards values. On further analysis, it was observed that the total weight and height gain was lower in both MDM and NMDM school children but MDM school children was minimum difference ranges than standard when compared to NMDM school children of present study in comparison to similar other anthropometric studies (Agarwal et al.(2000), Bhasin et al.(2002).

Table 3 :- Difference in the prevalence of thinness (BMI-for-age) between MDM and NMDM school children

Sex	Nutritional status (thinness)											
	Normal		Z-test (Sig)	Thinness		t-test (Sig)	Severe thinness		t-test (Sig)	Total Prevalence		Z-test (Sig)
	MDM	NMDM		MDM	NMDM		MDM	NMDM		MDM	NMDM	
	No (%)	No (%)		No (%)	No (%)		No (%)	No (%)		No (%)	No (%)	
Boys	41 (66.13)	32 (51.61)	<0.05	18 (29.03)	25 (40.32)	<0.05	3 (4.84)	5 (8.06)	NS	21 (33.87)	30 (48.39)	<0.05
Girls	39 (61.90)	30 (47.62)	<0.05	20 (31.75)	26 (41.27)	<0.05	4 (6.35)	7 (11.11)	NS	24 (38.10)	33 (52.38)	<0.05-+
Total	80 (64.00)	62 (49.60)	<0.05	38 (30.40)	51 (40.80)	<0.05	7 (5.60)	12 (9.60)	NS	45 (36.00)	63 (50.40)	<0.05

<0.05 = Significant at 5% level, NS = Not- Significant

In table, 3 MDM school children 66.13% of boys and 61.90% girls were found normal as per their BMI-for age . However , in the NMDM children 51.61% of boys and 47.62% girls were found normal as per their BMI-for-age. Comparing the status of total prevalence of thinness between MDM boys and NMDM boys it was noticed that NMDM boys was falling more than (48.39%) under total prevalence of thinness category as compared of MDM boys (33.87%) . In case of MDM girls were found less total prevalence of thinness category (38.10%) as compared to NMDM girls (52.38%) .Statistically significant difference regarding normal and total prevalence of thinness between MDM and NMDM school children was observed with the help of Z- test of difference of proportion between MDM and NMDM school children was found statistically significant (P<0.05) and prevalence of severe thinness between MDM and NMDM school children was found not-significant (P>0.05) .

Table 4 :- Difference in the prevalence of nutritional deficiency signs in MDM and NMDM school children

Body Parts	Symtoms	Deficiency disorder	Nutritional deficiency signs													
			Normal				Z-test (sig)	Prevalence				Z-test (sig)	Total			
			MDM		NMDM			MDM		NMDM			MDM		NMDM	
			Nor.	%	Nor.	%		Pre.	%	Pre.	%					
Eyes	Bitot spot	Vitamin A	72	57.60	60	48.00	<0.05	53	42.40	65	52.00	<0.05	125	100.00	125	100.00
Lips	Angular stomatitis	Vitamin B	80	64.00	69	55.20	<0.05	45	36.00	56	44.80	<0.05	125	100.00	125	100.00
Gums	Bleeding/swollen gums	Vitamin C	70	56.00	67	53.60	NS	55	44.00	58	46.40	NS	125	100.00	125	100.00
Legs	Bowed legs	Vitamin D	120	96.00	119	95.20	NS	5	4.00	6	4.80	NS	125	100.00	125	100.00

<0.05 = Significant at 5% level, NS = Not – Significant, Nor. = Normal , Pre.=Prevalence

Table, 4 indicates that the signs of Vitamin A deficiency like bitot spot was observed the prevalence was found to be higher in NMDM school children of all ages (52.00%) as compared to 42.40% in MDM school children . statistically significant difference regarding prevalence of vitamin A deficiency was observed in overall population of MDM and NMDM school children (P<0.05) .

On comparing the data on MDM and NMDM school children it was observed that the prevalence of vitamin B deficiency was higher (44.80%) in NMDM school children than in MDM school children (36.00%) Statistically significant differences regarding prevalence of vitamin B deficiency clinical signs across all ages was observed between MDM and NMDM school children (P<0.05).

Overall of vitamin C deficiency signs was 44.00% in MDM school children where as 46.40% was present in NMDM school children in overall population of MDM and NMDM school children, insignificant difference regarding prevalence of Vitamin C deficiency was not observed (P>0.05) .

In both the MDM and NMDM school children’s similar pattern was observed regarding the prevalence of vitamin D deficiency the lower percentage i.e. 4.0% and 4.80% was found in MDM and NMDM school children respectively .Statistically insignificant difference regarding prevalence of vitamin D deficiency between MDM and NMDM school children was observed (P>0.05).

From the above table we can say that the prevalence of vitamin A, vitamin B, vitamin C and vitamin D clinical signs were lower in MDM children than NMDM children .

Conclusion :- Statistically the mean weight and height of MDM school children in the present study was lower than that of ICMR (2004) standards. The mean weight and height of MDM school children more than NMDM school children. Significant difference in the prevalence of thinness for both MDM and NMDM boys and girls were observed. The prevalence of vitamin A, vitamin B, vitamin C and vitamin D clinical signs were lower in MDM children than NMDM children. In both the MDM and NMDM school children's statistically insignificant difference was observed regarding the prevalence of vitamin C and vitamin D deficiency ($P > 0.05$). Statistically significant difference was found prevalence of vitamin A and vitamin B deficiency clinical signs across all ages was observed between MDM and NMDM school children ($P < 0.05$). The nutritional status of the MDM school children under study was found better than NMDM school children.

The results of the present study are supports by the study of laxmaiah et al. (1999) and indicated that there was better impact of Mid Day Meal scheme on the nutritional status of the MDM school children in District Deoria.

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