ORIGINAL ARTICLE

A STUDY ON HEALTH EFFECTS OF MID-DAY MEAL PROGRAM ON PRIMARY SCHOOL CHILDREN, KURNOOL, A.P

Y. Padma Sri[1], D. V. B. Anusha[2]

HOW TO CITE THIS ARTICLE:
Y. Padma Sri, D. V. B. Anusha. "A Study on Health Effects of Mid-Day Meal Program on Primary School Children, Kurnool, A.P". Journal of Evidence based Medicine and Healthcare; Volume 2, Issue 14, April 06, 2015; Page: 2166-2173.

ABSTRACT: BACKGROUND: As a part of nationwide program, MDM scheme is being implemented in Kurnool district since January 2003. Any government program is always under the scrutiny of the media for its impact. Following a recent adverse report in the press on the mode of cooking and its effect on health of the children, this study was undertaken to understand the health effects, (both beneficial and adverse) of MDM on school children. **OBJECTIVES:** 1) To assess the potential risk for adverse health effects/ events at schools where MDM is being served. 2) To study the health effects of MDM on primary school children. **METHODOLOGY:** A cross sectional study was done in 28(50%) randomly selected Government and allied primary schools in Kurnool municipal corporation area. Data on the conduct of the MDM was collected from the head master/ teacher in charge, with a pretested semi structured questionnaire. 10% of all the students in each class (classes I -V), selected by systematic random sampling method were interviewed with a semi structured questionnaire which also included clinical examination and measurement of height and weight. **RESULTS:** Of the 28 schools, LPG was being used in 21(75%) schools, firewood in 7 (25 %) schools. Iodized salt was being used in only 19 schools (67.8%). No adverse events were ever reported from any of the schools. Of the 369 students interviewed 321(87%) were enrolled and 48(13%) not enrolled in MDM. 49.9% were with normal BMI, 10.3% were thin and 19.1% were severely thin when compared with WHO (2007) z scores. The respiratory morbidity was significantly high (p=0.0002) among students from schools where firewood was being used for cooking. Conclusions: Guidelines such as use of LPG gas for cooking, use of iodized salt etc. unless strictly adhered to, would discredit the effectiveness of the program.

KEYWORDS: Mid-day meal program, primary school children, and health effects.

INTRODUCTION: Mid-Day Meal Program(MDM) was initiated in India with the Objectives of 1) Enrolment, retention and attendance, 2) Nutritional impact 3) Social equity and 4) Inculcate good food habits in children. The programme envisaged the provision of cooked meals/ processed food of calorific value equivalent to 100g of wheat/rice for children studying in Classes I-V in all Government, local body and Government aided primary schools free of cost. This recommendation was based on a study done by NNMB (1990-92) on dietary consumption patterns of rural children using a one-day 24-hour recall method. It was observed that the children had a deficit of the magnitude of 628 kcal and 6-7g protein in the daily diets.[1] Later assistance was also extended to provision of essential infrastructure including kitchen-cum-store, adequate water supply for cooking, drinking and washing, cooking devices (stove, Chula, etc), cost of fuel, containers for storage of food grains and other ingredients and utensils for cooking and serving.[2]

As a part of nationwide program, MDM scheme is being implemented in Kurnool district since January 2003.[3] Apart from the known benefits of the scheme, there is every chance of problems arising out of cooking practices and/or inadequate hygiene standards, like food poisoning and also probability of other accidents during cooking and serving. A few studies on nutritional status of primary school children noted poor nutritional status of school children receiving Mid-Day meal everyday.[4] Any government program is always under the scrutiny of the media for its impact. Following a recent adverse report in the press on the mode of cooking and its effect on health of the children, this study was undertaken to understand the health effects, (both beneficial and adverse) of MDM on school children.

OBJECTIVES:

1) To assess the potential risk for adverse health effects/ events at schools where MDM is being served.
2) To study the health effects of MDM on primary school children.

MATERIALS AND METHODS:

Study Design: A cross sectional study.

Study Area: Government and aided Primary schools of Municipal Corporation area in Kurnool town.

Study period: January and February, 2015.

Study population: Primary school children.

Study sample: 10% of students from each class of 28 primary schools.

Sampling method: The list of the schools where MDM is being served is obtained from DEO office Kurnool. 50% of total schools were selected by simple random sampling method accounting to28 schools.

10% of children from each class were selected by systematic random sampling method accounting for 369 students.

Data collection: Interview with the help of a pre tested semi structured questionnaire, observation of school health cards and clinical examination after obtaining consent from the Headmaster/in charge teacher.

Data analysis: SPSS version 20 (trial version).

Materials: Pretested semi structured questionnaire, Stadiometer and weighing machine.

RESULTS: Of the 28 schools 22 were government and 6 were aided schools. 87% of the children were enrolled in mid-day meal scheme (figure1) and 98.1% Students of the total sample were attending the school regularly (>75% attendance). All the schools were having facilities like drinking water, hand wash area, and place to serve meals, place to clean the utensils, with in the school premises. (figure2)

Plates were generally not provided by the school. Children bring the plates with them and place to keep the plates was available in only 2 schools. Cooking was done in the premises in 24(85.7%) schools. Rest of the 4 schools, cooking was done in a place at a distance of ½ km from the school.

Out of 24 schools where cooking was done, 20 (83.3%) schools had separate kitchen. For 4 schools cooking was done in open air. For 4 schools where there was no place to store the grains, grains were stored at cook's home. In all the schools food items were washed before cooking, and cooked food was kept covered. In 24 schools where food was cooked with in the premises food was served immediately, in the rest of 4 schools there was a time lapse of approximately 30 minutes after cooking as it was brought from other place. Only in 19(67.8%) schools Iodized salt was being used and Lpg gas was the cooking fuel only in 75% of schools.[table1] No adverse events were reported from any of the schools while cooking or serving.

The students were almost equally distributed with respect to gender, the mean age was 8.8 years and 61.5% were Hindus. Mothers of 70.4% children were illiterate (Table 2) Majority 27(56.25%) of the students gave rice quality as the reason for non-enrolment (Figure 3). Similar reasons were given by the head master/in charge teacher and also by the students who consumed MDM less frequently.

ARI was the most common morbidity with 1.6 episodes per student per year. (Table 3) On clinical examination 112(30.4%) had some palmar pallor, 2(0.5%) had severe palmar pallor, bitot spots were seen in 3(0.8%) students and angular stomatitis in 7(1.9%) children. Thyroid enlargement was not seen in any of the students (table 4). Chronic illness like congenital heart disease was present in 1 pupil, asthma in 1 pupil, CSOM in 2 and TypeI DM in 1 child.

- When compared with WHO BMI z scores (2007)[5] 184(49.9%) students were having normal BMI, 38 (10.3%) were thin, 70 (19.1%) were severely thin and 34 (9.2%) were obese. (Figure 4).
- 55(47%) students suffered with ARI in the past 6 months in schools where firewood was used as fuel for cooking MDM, whereas 70(27.8%) students in schools where LPG was used as fuel for cooking MDM, and the difference was highly significant (p=0.0002).(Table 5) The number of students with deficit in calorie intake among MDM enrolled were 138(43%) whereas among students not enrolled were 15(31%) but the observed difference was not statistically significant(p>0.05).(Table 6) The mean calorie deficit was 345 kcal, which was about 54.9% of the deficit in the daily intake of school children as per NNMB6 which was 628kcal. The mothers of 44(40.3%) children who were malnourished (both underweight and overweight), were literate and 141(54.2%) children of illiterate mothers are malnourished (OR= 1.75).(Table 7)

Only 32(8.7%) students received vitamin A prophylaxis, 141(38.2%) received IFA prophylaxis and 95.1% received albendazole (table 8) under school health program.

DISCUSSION: In a study by S.R.Nigudgi et al[7] in primary school children found anaemia in 8.18%, ARI in 2.16%, worm infestation in 2.16%,Vitamin A deficiency in 1.98%, Refractive error in 2.41% of the children whereas this study revealed a much higher prevalence of anemia (30.9%). In another study by N.saluja et al, anaemia was detected in 37.7% (30.6% in boys and 45.2% in girls) children[8]. A study done by Dr.s sunil pal singh C et al[9] also revealed the prevalence of underweight in primary school children to be 28.9%, Overweight - 9.2% and Obesity - 4.4%. in Hyderabad, AP. Nabeela Fazal Babar et al[10] in their study found prevalence of malnutrition to be 42.3% in children of illiterate mothers and 20% in children of literate mothers

similar to this study This study found no significant difference in calorie deficit among children irrespective of enrollment in Mid-Day meal programme. The reasons could be that the students who were not enrolled in MDM were more affordable, also some students enrolled in MDM were coming to school without having breakfast. A laxmaiah et. Al[11] in their study on Impact of Mid-Day meal program on educational and nutritional status of school children in karnataka, found calorie deficit to be 45% as per NNMB[6] against 54.9% in this study. The reason could be that the dietary practices at home are not corrected.

CONCLUSIONS:

1. Almost all schools had good facilities and were practicing hygienic cooking practices.
2. There were 1.6 episodes of ARI/student/year, 0.7 episodes of diarrhoea/student/year, 1.1 episodes of Pain abdomen/student/year, and 0.13 episodes of fever/student/year.
3. There was a statistically significant association between use of firewood and morbidity of school children with respect to ARI.
4. 30.9% of the school children were having anaemia.
5. 50.7% of the students were found to be malnourished.
6. 41.4% of the total students were having calorie deficit with no significant difference between MDM and non-MDM consumers.

RECOMMENDATIONS:

1. Guidelines such as use of LPG gas for cooking, use of iodized salt etc. unless strictly adhered to, would discredit the effectiveness of the program.
2. In addition to Mid-Day meal there is a need for awareness programmes regarding balanced diet to correct the deficit and thereby the nutritional status of the children.
3. Iron folic acid tablets and Vitamin A to be given regularly under school health program without missing any of the schools.

ACKNOWLEDGEMENTS: The authors wish to acknowledge the support given by the interns posted in SPM department in the month of January, the principals of all the schools for their co-operation, the children for their enthusiastic participation; and the principal, Kurnool Medical College, Prof and HOD, community medicine department for giving the necessary permission.

REFERENCES:

1. Sushma Sharma et al, Evaluation of Mid-Day meal programme in MCD schools, Nutrition Foundation of India, scientific report 18, 2006.
2. National Programme of Nutritional Support to Primary Education, 2006 [Mid-Day Meal Scheme] Guidelines.
3. Rajinder Paul, Mid-Day meal programme in Kurnool district of Andhra Pradesh, MCO, Press Information Bureau.
4. Alim F et al, Nutritional status of children attending Mid-Day Meal Scheme in government primary school in Aligarh city, Indian journal of community health, vol 24,No.3,July 2012 – September 2012.
5. Growth reference 5-19 years, WHO standards accessed from http://www.who.int/growthref/who2007_bmi_for_age/en/

6. National Nutrition Monitoring Bureau, National Institute of Nutrition, Indian Council of Medical Research, Hyderabad - 500 007. India 2000.
7. S. R. Nigudgi et.al Morbidity pattern among school children in Gulbarga city, Medica innovatica December 2012 volume 1, issue 2.
8. N Saluja, S Garg, H Chopra. Prevalence of Morbidity and Morbidity Pattern in School Children (5-11 Yrs) In Urban Area of Meerut. The Internet Journal of Epidemiology. 2010 Volume 9 Number 2.
9. Dr.Sunil pal singh c. Malnutrition Among Primary School Children In Hyderabad, Andhra Pradesh, India International journal of Technical Research and Applications e-ISSN: 2320-8163, www.ijtra.com Volume 2, Issue 1 (jan-feb 2014), PP. 36-39.
10. Nabeela Fazal Babar, Rizwana Muzaffar, Muhammad Athar Khan, Seema Imdad. Impact of Socioeconomic Factors on Nutritional Status in Primary School Children. J Ayub Med Coll Abbottabad 2010; 22(4).
11. A. Laxmaiah et.al Impact of Mid-Day meal program on educational and nutritional status of school children in karnataka, Indian Pediatrics 1999; 36: 1221-1228.

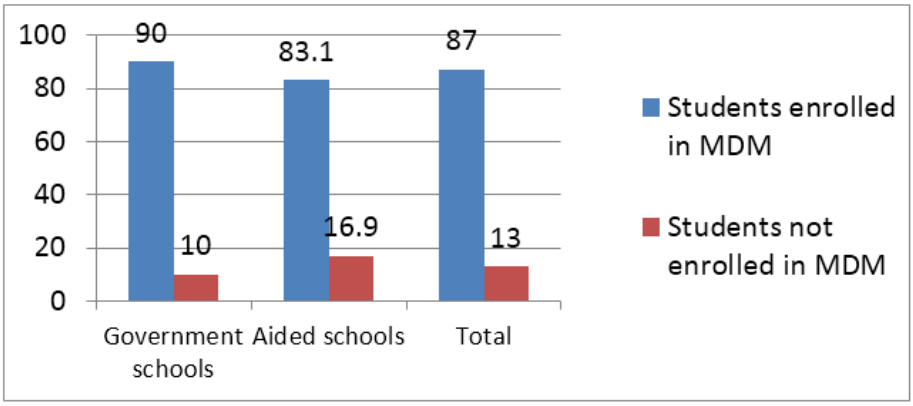

Fig. 1: Enrollment of students by type of school

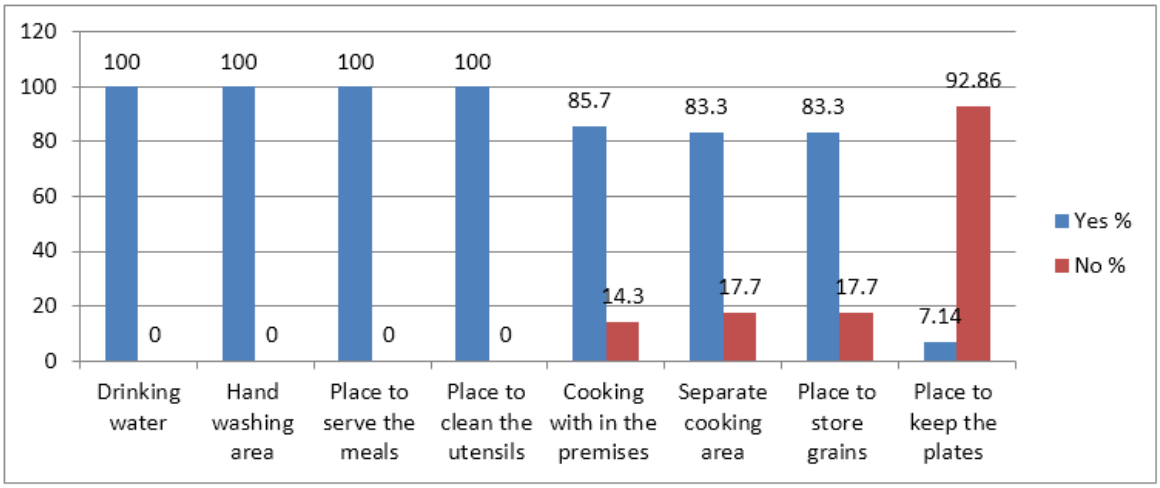

Fig. 2: Facilities available at schools

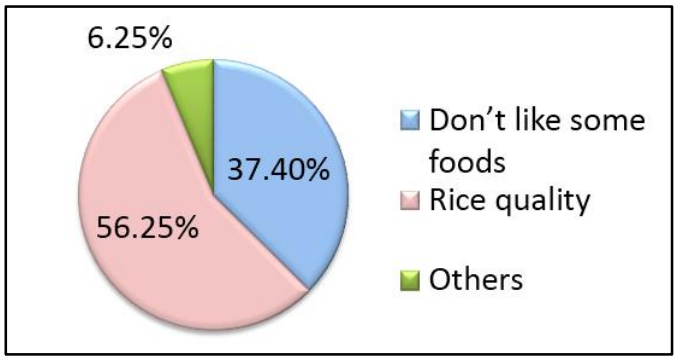

Fig. 3: Reasons for non-consumption of MDM

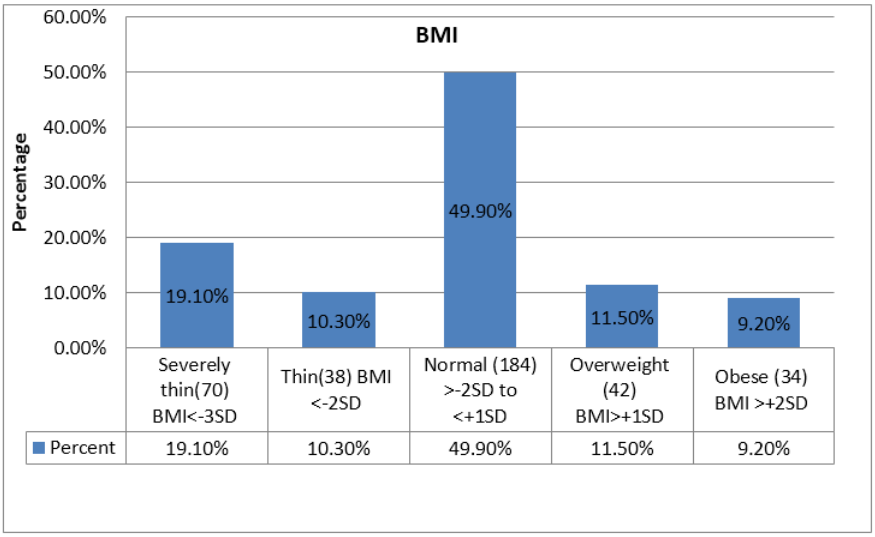

Fig. 4: Distribution of students by WHO BMI z scores

Type of fuel	Frequency of schools	Percent
LPG	21	75
Firewood	7	25
Total	**28**	**100**

Table 1: Distribution of schools by type of cooking fuel

Age	Age	No.	%
	<8yrs	99	26.8
	8-12 years	243	65.9
	13-15 years	27	7.3
Sex			
Sex	Male	187	50.7

	Female	182	49.3
Class			
Class	I	53	14.4
	II	60	16.3
	III	81	22
	IV	82	22.1
	V	93	25.2
Religion			
Religion	Hindu	227	61.5
	Muslim	70	19
	Christian	72	19.5
Mother's literacy			
Mother's literacy	Illiterate	260	70.4
	Primary school	47	12.7
	Middle school	28	7.6
	High school and above	34	9.2

Table 2: Socio demographic factors of study subjects

Disease	Total No of episodes in past 6 months	No of episodes/ student/ year
ARI	290	1.6
Diarrhoea	124	0.7
Pain abdomen	204	1.1
Fever	25	0.13

Table 3: Morbidity pattern in primary school children

Nutritional problem	No.	%
Anaemia No palmar pallor	255	69.1%
Some palmar pallor	112	30.4%
Severe palmar pallor	2	0.5%
Vit A Deficiency	3	0.8%
Vit B Deficiency	7	1.9%
Iodine deficiency	0	0%

Table 4: Distribution of students by Nutritional problems

Type of fuel	Students with ARI in past 6 months		Total
	Yes	No	
Firewood	55(47%)	62(53%)	117

LPG	70 (27.8%)	182(72.2%)	252
Total	**244(66.1%)**	**125(33.9%)**	**369**

Table 5: ARI vs type of fuel

X^2 =13.1919, P = 0.0002.

Enrolled in MDM	**Calorie deficit**		
	No	**Yes**	**Total**
Yes	183(57%)	138 (48%)	321
No	33(68.7%)	15(31.3%)	48
Total	**216(58.5%)**	**153(41.5%)**	**369**

Table 6: calorie deficit vs. enrollment in MDM

X^2 = 2.371, P = 0.1.

Mother's literacy	**Malnutrition**		**Total**
	No	**Yes**	
Literate	65	44	109
Illiterate	119	141	260
Total	**184**	**185**	**369**

Table 7: Nutritional status of students vs. literacy status of mothers

Odds ratio=1.75.

Received in past 6 months	**Yes**	**No**
Vitamin A	32(8.7%)	337(91.4%)
IFA prophylaxis	141(38.2%)	228(61.8%)
Albendazole	351(95.1%)	18(4.9%)

Table 8: Prophylactic measures received under school health program

AUTHORS:

1. Y. Padma Sri
2. D. V. B. Anusha

PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of Community Medicine, Kurnool Medical College.
2. 2nd Year Post Graduate Student, Department of Community Medicine, Kurnool Medical College.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Y. Padma Sri,
Department of Community Medicine,
Kurnool Medical College,
Kurnool, Andhra Pradesh.
E-mail: padmasriyalamanchili@yahoo.co.in

Date of Submission: 28/03/2015.
Date of Peer Review: 29/03/2015.
Date of Acceptance: 02/04/2015.
Date of Publishing: 04/04/2015.