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Evaluative Study of Mid Day Meal Programme in Amravati and Nagpur District

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Abstract: ***The Mid Day Meal programme in India has long been positioned as a key social intervention aimed at improving child nutrition, school attendance, and learning outcomes, particularly in economically vulnerable settings. This study evaluates the implementation and effectiveness of the Mid Day Meal programme in selected rural and urban schools of Amravati and Nagpur districts, with a focus on nutritional adequacy, hygiene practices, food quality, and programme management at both school and centralized kitchen levels. Using a descriptive, cross sectional research design, data were collected from 1,000 students across primary and upper primary schools through anthropometric assessment, structured questionnaires, observations, and laboratory analysis of food samples. The findings indicate high programme acceptance and widespread consumption among students, with no significant gender or area based differences in response patterns. While centralized kitchens demonstrated strong compliance with hygiene and food safety standards, gaps were observed in serving size uniformity, teacher engagement during meal distribution, and the achievement of age specific nutrient norms, particularly for energy and protein intake. The study highlights modest improvements in dietary intake and hygiene practices among children and underscores the continued relevance of the Mid Day Meal programme in addressing undernutrition, especially during public health disruptions such as the COVID period. Strengthening monitoring mechanisms, nutrition education, and standardization of practices is essential to enhance the programme's long term nutritional and educational benefits.***

Keywords: Mid Day Meal Programme, school nutrition, child health and hygiene, rural and urban schools, nutritional evaluation

1. Introduction

As per the Global Nutrition Report 2020, India is among 88 Countries that are likely to miss global nutrition targets by 2025. Global hunger Index (GHI) 2020 India has been ranked at 94 among 107 countries in the GHI 2020 India has a level hunger that is serious. (14) **Ref. Global Nutrition Report 2020** The situation of children in India is very concerning for planners of our country. Presently nearly half of the Indian children are undernourished. This is rightly called as "Silent Emergency" by Khera (2006). This makes primary education and basic health facilities as fundamental challenges of human development in India (Afridi 2005) (15) Midday meal scheme was launched by the Ministry of Human resource development during 1995-96 for the benefit of students in primary schools. Food grains (rice and wheat) were supplied by FCI free of cost to the states and union territories. However, FCI charges the economic cost of the food grains supplied under the Scheme from the Ministry of HRD. A quantity of 1.91 lakh metric tons of wheat and 3.74Lakh tons of rice was lifted under the scheme during 1995-96. Initiated in 1995 the NMMP aims to increase primary school attendance and retention as well as improve the nutritional status and learning achievements of school children generally in the 6 to 11 years old age group. Some states emphasize the education of young girls through this programme. (**Ref. Nutrition and Dietetics - Shubhangini A. Joshi 2002)**

The school programmes were started in our country keeping in mind the social and economic advancement of the country. Urbanisation, Industrialisation and an increase in the number of working mothers frequently brought about longer school days. This mean, that children often did not receive proper meals at home and therefore needed to have a meal at school. Thus, a free compulsory primary education became more common and pressures were brought to bear on governmental authorities to provide school lunch.

Mid-day meal programme for school children is comes under Ministry of education. On the recommendation of National school health committee, the government of India started a scheme for providing midday meal to school children is extended to all states with effect from is 15thAugust 1995. The government of India pays 40% of expenditure and 60% is borne by the states. The meal is usually prepared from special foods such as Balahar, Soya fortified Bread, Indian Multipurpose food, Skim milk Powder and Wheat. The children studying in corporation schools are given midday meals. The meals given are based on a combination of cereals, pulses and leafy vegetables. Eggs are given once a week. Such a diet would increase the amountof vitamins and minerals result in weight gain and clearance of deficiency symptoms. **(Ref. B. Srilakshmi second edition**)

The history of Mid Day Meal scheme has been implemented in the union territory of pounducherry under the French Administration since 1930.In the post independent India Mid Day Meal Scheme was first launched in Tamilnadu, pioneered by the Former chief minister K. Kamaraj in the early 60's. By 2002, the scheme was implemented in all the states under the orders of the supreme court of India.

The school age period has been called the latent time of growth. The rate of growth slows and body changes occur gradually. Girls usually out distance boys by the part of this period. The slowed rate of growth during this period results in a gradual decline in the food requirement per unit of body weight. Nutritional requirements of boys and girls are more or less the same till the first 9 years. After that there is a variation in some nutrients.

The school age period is one of steady growth, usually with fewer feeding problems than during toddler and preschool years. A natural increase in appetite is responsible for an increase in food consumption. The child growing independence leads to a gradual transfer of control of food selection from the parent to the child.

Parents or caretakers should provide nutrition education for their children as being role models. Parents should encourage the child to eat appropriate portion size, eating a variety of foods and trying new foods. Negative behaviour such as using food as an emotional coping mechanism or as a reward, should be discouraged.

Between the ages of 8 to 11, some girls may be at risk for developing eating disorders. Snacks remain an important part of the diet. The meal taken o return from school is important to meet the nutritional requirement and to have interaction with parents.
Though media influences diet choices of children, parents should know nutritional fats and suggest to their children. Government should regulate advertisements aimed at children.

There is an increasing interest and participation in other activities which compete with meal times. The important relationship of sound nutrition and learning has long been established.

Research Design: Descriptive research design will be use for the Study.

Locale of Study
Amravati district is a district of Maharashtra state in central India. It is the administrative headquarter of Amravati division, which is one of the two divisions in Vidarbha (other being Nagpur), out of total 6 regions in state of Maharashtra. The district is situated between 20°32' and 21°46' north latitudes and 76°37' and 78°27' east longitudes. The district occupies an area of 12,235 km². The district has boundaries with Betul District of Madhya Pradesh state to the north, and with the Maharashtra districts of Nagpur to the northeast, Chindwara district of Madhya Pradesh to the northeast Wardha to the east, Yavatmal to the south, Washim to the southwest, and Akola and Buldhana.

Nagpur is the third largest city and the winter capital of the Indian state of Maharashtra. Total population of city is 4,653,570 according to 2011 data. It has been proposed as one of the smart cities in India .The total area of Nagpur (Rural) is 659.59 sq. km. with population density of 458 per sq.km. Out of total population 49.11% of population lives in Urban Area and 50.89 % lives in rural area. There are 19.45% Scheduled caste (SC) and 8.5% Scheduled Tribes (ST) of total population in Nagpur (rural) Taluka. Urban population of Nagpur 2405665 of which 1225405 are males and 1180260 are females.

Sample size and sample design
27-30 schools will select and 1000 samples, Students (Both Boys and Girls) will be select from rural and urban primary and secondary schools of Amravati and Nagpur District for the above study.

Table 1: Showing frequency and percentage of male and female respondents

Gender	Frequency	Percentage
Male	500	50%
Female	500	50%
Total	1000	100%

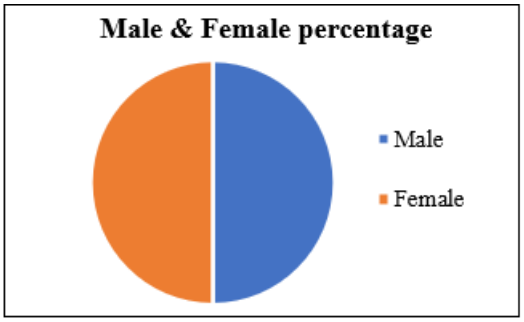
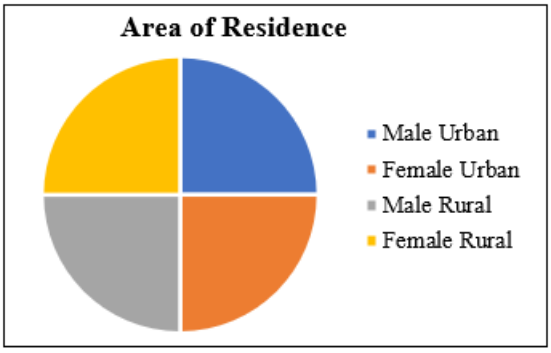


Table 2: Showing frequency and percentage of Urban and Rural male and female participants

Area of residence	Male	Female	Total
Urban	250	250	500
Rural	250	250	500
Total			1000



Comparison between male and female respondents with respect to responses given to statement no. 1

Question 1

Gender	Frequency count & Percentage	Responses (Q1)		Total
		Yes	No	
Male	Count	476	24	500
	Expected Count	477.0	23.0	500.0
	% within Gender	95.2%	4.8%	100.0%
Female	Count	478	22	500
	Expected Count	477.0	23.0	500.0
	% within Gender	95.6%	4.4%	100.0%
Total	Count	954	46	1000
	Expected Count	954.0	46.0	1000.0
	% within Gender	95.4%	4.6%	100.0%

Chi-square = .091
p-value (0.763) is greater than chi-square value hence non-significant
p-value of 0.763, indicating no significant association between gender and Q1 responses

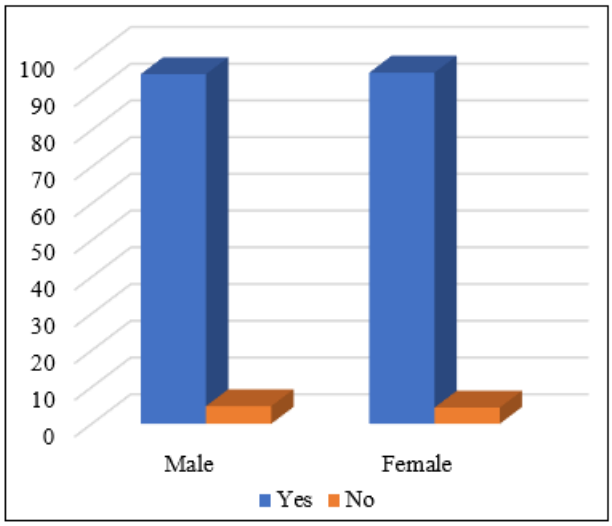


Figure 1

Comparison between male and female respondents with respect to responses given to statement no. 2

Question 1

Gender	Frequency count & Percentage	Responses (Q2)		Total
		Yes	No	
Male	Count	479	21	500
	Expected Count	478.0	22.0	500.0
	% within Gender	95.8%	4.2%	100.0%
Female	Count	477	23	500
	Expected Count	478.0	22.0	500.0
	% within Gender	95.4%	4.6%	100.0%
Total	Count	956	44	1000
	Expected Count	956.0	44.0	1000.0
	% within Gender	95.6%	4.4%	100.0%

Chi-square = .095.
p-value (0.757799) is greater than chi-square value hence non-significant
p-value of 0.757799, indicating no significant association between gender and Q2 responses

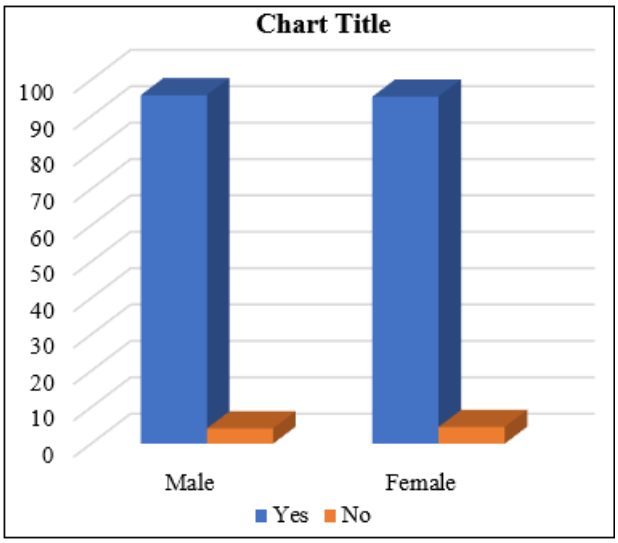


Figure 2

Based on the provided data, here's a summary and analysis of the comparison between urban and rural respondents with respect to their responses to statement no. 2.

Conclusion
The analysis demonstrates that there is no statistically significant difference in the responses to Question 2 between urban and rural respondents. Both groups show a similar pattern of responses, with a large majority responding "Yes" and a small minority responding "No." This result suggests that the factor of being from an urban or rural area does not influence the responses to the specific statement in Question 2. Based on the data provided in the image, here is an analysis of the comparison between male and female respondents with respect to their responses to statement no. 4.

Comparison between male and female respondents with respect to responses given to statement no. 3

Question 3

Gender	Frequency count & Percentage	Responses (Q3)		Total
		Yes	No	
Male	Count	413	87	500
	Expected Count	418.5	81.5	500.0
	% within Gender	82.6%	17.4%	100.0%
Female	Count	424	76	500
	Expected Count	418.5	81.5	500.0
	% within Gender	84.8%	15.2%	100.0%
Total	Count	837	163	1000
	Expected Count	837.0	163.0	1000.0
	% within Gender	83.7%	16.3%	100.0%

Chi-square = .887
p-value (.346) is greater than chi-square value hence non-significant
No significant difference exists between male and female respondents on Q no. 3

2. Summary of Results

The table displays the frequency counts and percentages of "Yes" and "No" responses from urban and rural respondents to Question 2.

Urban Respondents
Yes: 467 (93.4% within area)
No: 33 (6.6% within area)
Total: 500
Yes: 473 (94.6% within area)
No: 27 (5.4% within area)
Total: 500

Expected Counts
For both urban and rural areas, the expected counts for "Yes" and "No" responses are calculated as follows:

Yes: 470
No: 30
Total: 500
Combined Total
Yes: 940
No: 60
|Total|: 1000
Statistical Analysis
Chi-square value: 0.638
p-value|: 0.424

Interpretation
The p-value of 0.424 is greater than the chi-square value, indicating that there is no significant association between the area (urban or rural) and the responses to Question 2. This means that the likelihood of a respondent answering "Yes" or "No" to Question 2 does not significantly differ based on whether they are from an urban or rural area.

Visualization
The provided chart (not fully visible in the image) likely illustrates the percentage distribution of "Yes" and "No" responses for urban and rural respondents. Both urban and rural respondents have a high percentage of "Yes" responses and a low percentage of "No" responses, supporting the statistical analysis that there is no significant difference between the groups.

Observations findings of MDM at School
- Observation of malnutrition by evaluating students.
- Observation of MDM menu chart weekly meal.
- Observation of kitchen and kitchen garden spinach ,methi,sambhar grown in school campus for Mdm menu preparation.

Phase 1 B: Evaluation of MDM at kitchen
Somewhere roof problem of kitchen find out Some schools specifically Gramin, use vegetables grown at school from kitchen garden and use it in mdm cooking and some schools have not kitchen garden.

Nutrient Composition and Quality Attributes of MDM

Nutrient and microbial analysis of food samples was carried out to study the quality attributes of food items served by the centralized kitchen in study area. Food samples were collected in sterile containers using sterile ladles. Samples were collected from the kitchen for nutrient analysis; Microbial analysis was carried out on food samples collected from the kitchen at the time of production and from the school while MDM was being served. This was done to understand the changes in microbial profile of food from production to serving. Analysis was done in a NABI, accredited laboratory.

3. Result and Discussion

The age of majority of children is in primary or upper primary schools. Hence, they can be benefited from the school feeding program. Mid-Day Meal program is world's largest school feeding program under which children from all the Government and Government aided primary school children are given hot cooked meals on school days. program being implemented, prevalence of under nutrition among school age children and adolescents is still very high in India as reported by national databases and various research studies NFHS 3, NFHS 4, CNNS 2019. Primary schools are considered a beginning of healthy lifestyle in this age group. Imparting Nutrition Health Education can make them aware about healthy choices related to diet as well as hygiene. This may translate into practice and influence their nutritional status on a long run. In view of this, present study was planned "to evaluate the Mid-Day Meal program in rural and urban Amravati and Nagpur and to study the impact of Rural and urban. Since the study focused on children of upper primary section, sample in the study was drawn from these schools, The study was carried out in two-part Evaluation of Mid-Day Meal Program in Rural Amravati and urban Nagpur district and Evaluation of Mid-Day Meal Program in Urban Amravati and urban Nagpur district.

This was a cross-sectional study. The area was divided in a way that each region schools from each area were randomly selected for this phase. Specific objectives of this phase were:
1) To study the implementation of Mid-Day Meal Program at the school level
2) To investigate the storage, food handling and cooking practices in the centralized kitchen
3) To study the attendance and menu prepared in mdm program in school.
4) To study the policy perspectives of scheme.

Evaluation of MDM at school level. This phase was conducted l in the selected schools. All the children studying in 5th to 8th standard were enrolled in the study after obtaining a written consent. Data on anthropometry, socio economic status as well as practices and perceptions regarding MDM, sanitation at cooking place were collected. through spot observations implementation of MDM at school level was also studied. Data onCOVID condition record of school during pandemic period. Raw food distributes, like chana chole, mug dal, green gram, dal, Rice and money transfer in students parent account also.

Socio Economic Status
- Majority of the children were Hindu (97.3%) and only 2.7% were momedian.
- One fourth (43.9%) children were from nuclear families followed by joint (29.1%) and extended nuclear (26.8%) families.
- Majority of the children belonged to lower middle income to lower income class
- class
- 45 boys% and 55%girls from target population and study group
- Practices and policy perspectives and Perceptions regarding Midday Meal
- Most (93%) of the children consumed MDM in schools
- Main reason for not consuming MDM was not liking the taste among those who reported that they didn't eat MDM at school.
- Khichadi vegetable fried rice is the most liked item (28.7%) and chana (24.6%) was the most disliked item served under MDM, among children.
- Three fourth of the children opinioned that MDM is beneficial for them. The main benefit of MDM as reported by the children, was improvement in health (28.7%).

Practices and Perceptions regarding kitchen
All the children reported to be washing their hands before handling or consuming food, after eating and after using toilet,
- Only 43.2% children were washing hands after going home from outside followed by 31,5% washing their hands after doing household chores.
- The food cook is hygienic and clean and ready to eat in safe condition.

- The utensils like plates used are clean and serving pots are good.
- Only 38.9% and 48.2% of the children are met the nutrient energy and protein in required amount as per their age. More boys consumed amount of MDM that met nutrient norms as compared to girls.

Observations findings of MDM at School

- Regular supply of safe drinking water in the schools was recorded in most of the observations.
- Open spaces like corridors, play grounds and open shaded dining areas were used for serving MDM in the schools. carpets to sit for children at mealtime lunchtime use in school daily.
- Serving was done by MDM helpers and senior students in the schools.
- Serving spoons being used in the schools were of different sizes. Jugs and other utensils were also used in some schools for serving.
- Plates for consuming MDM were provided from school. Somewhere tiffins are brought by children for mdm menu.
- It was observed that teachers were present at the time when meals were started being served. However, presence of teachers for monitoring throughout MDM serving as well as motivation by teachers were lacking. Waste-bins for collecting plate waste, were present in all the schools.

- Observation of malnutrition by evaluating students.
- Observation of mdm menu chart weekly meal.
- Observation of kitchen and kitchen garden spinach, methi, sambhar was grown. This garden run by school.

Phase 1 B: Evaluation of MDM at centralized kitchen

Some schools specifically Gramin, use vegetables grown at school from kitchen garden and in mdm cooking and some have not kitchen garden.

Major findings of the observations are given below: menu chart and menu

- The centralized kitchen was run by The Akshaya Patra Foundation (TAPF)
- The kitchen was divided into different sections dedicated to specific functions such as storage, cold storage room, vegetable processing section, cooking area, vessel washing area, vessel store, dispatch/ loading area, vessel unloading area, boiler section, van washing area etc.
- Various machinery and equipment such as rice cleaning machine, rice silos, flour sieving machine, dough kneading machines, vegetable cutter, potato peeling machine, Puran yantra, Appe Patra were being used for various processes in food production in the centralized kitchen,
- The centralized kitchen had steam boilers and biogas plant. LPG, steam and bio-gas were used as fuels in the kitchen.
- Chimney for suffocation in kitchen use by school. They were following personal hygiene practices.
- Good cleanliness and hygiene were maintained in kitchen and storage area of the centralized kitchen.
- Cereal grains under Mid-day Meal program were provided through the nearest FCI godowns in both centralized as well as school level kitchens. All the other food items were purchased by the NGO from local vendors.
- Raw food items were systematically stored in close packets on raised platforms that were kept away from the walls, as recommended in the program guidelines.
- Kitchen floors were kept clean throughout cooking. Floors and all the machineries were thoroughly cleaned after cooking. All the utensils were
- Cleaned using three bucket method and steam sterilized before storing in the vessel storing area.
- Raw food items were cleaned before cooking. Vegetables, pulses and rice were thoroughly washed before using.
- A well-planned dispatch process was followed in order to ensure error free deliveries of meals to the schools,
- Pest-control was done by a company hired on a contract basis every day.

Major findings of the analysis are given below.

- The MDM lunch menu provided by the centralized kitchen included curry-based items (dal and subji), rice-based items (jeera rice, chana rice, vegetable pulao, peas pulao and khichadi) as well as roti and thepla,
- In addition to this, snack items such as fried groundnuts, sukhadi, bataka poha, idli
- Energy content of rice-based items ranged from 65 Kcal/100 gm for khichadi to 173 Kcal/100 gm for chana rice, Curry based items had lower calories per 100 gm as compared to rice-based items and rotis like puri, Aloo subji had the lowest caloric content (37 Kcal/100 gm). All the snacks served as MDM breakfast were high calorie foods, except for Idli (159 Kcal/100 gm.). Fried groundnuts had the highest calorie content (whole groundnuts-643 Kcal/100 gm and split grounduts-597 Kcal/100 gm.).
- Chana rice provided highest amount of protein (7.38 gm./100 gm.) among all the food items served in lunch. Fried groundnuts had the highest amount of protein (whole groundnuts- 23.89 gm./ 100 gm. and split)

Conclusions

Results of the study showed that the responses to the midday meal program is highly satisfactory level and very useful and important in covid pandemic condition. The food provided by the centralized kitchen is hygienically prepared and safe for consumption. Apart from this, motivation from teachers to consume MDM, uniformity of serving size depending on the standard and ensuring proper hygiene practices at school need to be focused. It also showed to slightly improve dietary intakes among children. Improvement was also seen in hygiene practices, especially at school. The results drawn from above study are-

- The attendance of student is for purpose to save money and eat food in school BPL card holder parents response to mdm meal is satisfactory and good
- Sufficient cook rice distributed in school
- Mdm meal is more nutritious and healthier
- Quality of meals is increase in school
- Rural students and parents' main purpose is to eat food in school and work at home because of poverty.
- Hygienic practices 40% in rural 65% in urban occurs
- The main target or view of mdm scheme or program is students to eat food in large amount and increase strength of their school

- Malnutrition symptoms and suffering from infectious diseases occurs in students that are remove by eating mdm meal.
- School progress and attendance record of students girl and boys both are satisfied
- Gender wise evaluative survey takes place
- Critical conditions are suffered from fever girl are disturb from problem of lice in head, anemia. Weak performance
- High calorie and protein provided.

The Kitchen Garden, parasbag develop in some school near about 35% school having their own parasbag. Student of school grown leafy vegetables there and use them for MDM menu. These activities can be useful into the existing MDM programmer to ensure adequate knowledge on nutrition, health and hygiene among children. prevalence of under nutrition is found by observation method only among children studying in Government run primary and upper primary schools of rural Amravati and Nagpur schools

- Energy content of rice-based items ranged from 65 Kcal/100 gm for khichadi to 173 Kcal/10 gm for chana rice, Curry based items had lower calories per 100 gm as compared to rice-based items and rotis like puri, Aloo subji had the lowest caloric content (37 Kcal/100 gm). All the snacks served as MDM breakfast were high calorie foods, except for Idli (159 Kcal/100 gm.). Fried groundnuts had the highest calorie content (whole groundnuts-643 Kcal/100 gm and split grounduts-597 Kcal/100 gm.).
- Chana rice provided highest amount of protein (7.38 gm./100 gm.) among all the food items served in lunch. Fried groundnuts had the highest amount of protein (whole groundnuts- 23.89 gm./ 100 gm. Somewhere masoor dal pakode was prepared.

4. Conclusion

Results of the study showed that the responses to the midday meal program is highly satisfactory level and very useful and important in covid pandemic condition. The food provided by the centralized kitchen is hygienically prepared and safe for consumption. Apart from this, motivation from teachers to consume MDM, uniformity of serving size depending on the standard and ensuring proper hygiene practices at school need to be focused. It also showed to slightly improve dietary intakes among children. Improvement was also seen in hygiene practices, especially at school. The results drawn from above study are-

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- Critical conditions are suffered from fever girl are disturb from problem of lice in head, anemia. Weak performance
- High calorie and protein provided.

5. Recommendations

- Efforts should be made to standardize the serving size of cooked food according to the nutrient norms for students of primary and upper primary sections. MDM helpers should be trained to serve food in the standardized quantity to ensure that children consume sufficient food to meet the nutrient norms.
- There is a need to ensure availability of uniform serving spoons and plates at every school. Proper washing of serving spoons and plates before and after serving MDM also needs to be ensured.
- Salary of MDM meal cook is sufficient as per their work.
- The MDM lunch menu provided by the centralized kitchen included curry-based items (dal and subji), rice-based items (jeera rice, chana rice, vegetable pulao, peas pulao and khichadi) as well as roti and thepla,
- In addition to this, snack items such as fried groundnuts, sukhadi, bataka poha, idli

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