

Monitoring and Evaluation of Mid –Day Meal in Delhi Schools

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Abstract: *Mid-Day Meal Scheme (MDMS) is the World largest school feeding programme in the nation. It has been reported that MDMS has catered to the nutritional needs of school children in both rural and urban areas. Improving the conditions of the underprivileged and backward has been the major issues while forming the policies of India as a welfare state. The target is children in many policies, acts and also in schemes. The Government of India started Mid-day meal (MDM) scheme in the government primary schools which is now intended upto Upper primary with the objective of improving health of the poor children. The objectives of the study were to know the status of the mid day meal, dietary and hygiene practices, its monitoring and evaluation at Upper primary Classes in Delhi. For the purpose study, sixty school children in the age group 10-12 years were randomly selected with equal number from both Girls and Boys schools. It was observed that a cyclic menu for six days provided by mid- Day Meal Cell was uniformly followed by both schools. The data revealed that Aloo Sabji with Poori was the most liked meal (45%) followed by Sambhar Rice (35%), Poori Chole (30%), Khadi Rice (30%) and Rice Chole (29%). The least preferred meal was Halwa with Black Chana (26%). Personal hygiene practices of both distributor and children were poor. The temperatures of food at time of serving were in the "danger zone" (between 5^o C to 65^o C). Teachers and parents felt that safe water supply/ proper toilet facilities was more important. None knew about the source of supply of MDMS.*

1. Introduction

Children are the biggest human resource and are recognized as the first call of a nation's agenda for development since early childhood is both a vulnerable and an extremely critical foundation of adult life (Mahajan, 2000; Gopalan, 1995; Kumar et al, 1990 and Devdas, 1983). In India, child malnourishment is severe and a major cause of morbidity. NFHS-3 (2005-06) reveals 24% children are severely stunted and 16% are severely underweight. India Global Hunger Index (GHI), 2013 states that, 17.5% population in India is undernourished. Mid-day meal programme is a

promising strategy to bridge dietary inadequacies of beneficiaries and improve their performance. Scheme was extended to all upper primary classes in Delhi by 2009-10. With over 10.45 Crore School children as its beneficiaries, MDMP in India is the largest school feeding programme in the world. Its objectives are: To improve the nutritional status of children and encourage them to attend school more regularly and to help them concentrate on classroom activities. To enhance school attendance and to reduce gender, cast and creed discrimination. Mid-Day-Meal Programme (MDMP) was initiated primary classes in August, 1995 in Delhi. MDM switched over to hot cooked Meal in July, 2003 (phase wise): in primary schools were covered under the scheme by December, 2004.m Directorate of Education (DOE) introduced hot cooked meals in 2005.

2. Review of literature

Nutrition scenario of school children

It is well acknowledged that investment in human resource development is a pre requisite for any nation's progress. Children of today are citizens of tomorrow, and hence improving their nutritional status becomes extremely important. India is one among the many countries where child malnutrition is severe and also a major underlying cause of morbidity (Children in India, 2012). Malnutrition is not the result of a single cause– the problem is multifaceted, the causes acting combination with other factors like poverty, purchasing power, health care, ignorance on nutrition and health education etc. The latest NFHS-3 (2005-06) findings reveal that the incidence of malnutrition amongst Indian children is both alarming and frightening as nearly 24 percent are severely stunted and 16 percent severely underweight.. Well-nourished children perform better in school, grow into healthier adults and are able to give their own children a better start in life (World Bank, 2006; Ramachandran, 2001; IFPRI, 2000.

Hunger and Hidden Hunger

The number of hungry people in the world was estimated at 842 million in 2011-13 by the Global Hunger Index (GHI) which was slightly lower than

from the 870 million estimated in 2010-12. In India, the proportion of undernourished declined from about 21 percent of the population to 17.5 percent, the proportion of underweight children declined from 43.5 percent to about 40 percent and under-five mortality declined from 7.5 percent to about 6 percent as compared to the 2010 figures. Despite these caveats regarding the GHI data, India still continues in the "Alarming" category of countries classified by severity of hunger between 20 and 29.9 (Joint WHO-FAO Report, 2013).

Hunger is not just a state of mind or an urge to eat more but not eating enough to meet nutritional needs of the body. It does not only refer to the overt and obvious hunger of poor but to a more insidious hunger caused by eating food that is filling but deficient in essential vitamins and minerals – known as "**Hidden Hunger**". It affects over 30 percent of the world's population, causing increased morbidity and mortality, impaired cognitive development and reduced learning ability and productivity, reduced work capacity in populations due to high rates of illness and disability and tragic loss of human potential (GAIN, 2006).

Hunger and education

"Hunger is a barrier to learning ... A hungry child cannot concentrate nor perform and is unlikely to stay in school" (IFPRI, 2001). Education of children (particularly girls), during primary years is a key determinant of the development / progress of a nation since educated people make better workers, have higher incomes, bear fewer and healthier babies (Schultz 2001; Jamison and Lau, 1982). According to NFHS-3 surveys (2005-06), 72 percent of Indian children attend primary school. The main reasons for dropping school include – high cost of education, poverty as children are required to household work / work on farm / family business and lack of interest in schooling. However, in comparison to the NFHS-2 data, the dropout rate for females has declined (by 3%) but not in males.

Nutritional needs of school children: School age is a crucial period of growth and development. Children are constantly building up new tissues and replacing old ones as well as increasing their mental abilities. Their nutritional requirements are high per unit body weight than those of adults. Good nutrition is thus a basis for their optimum development and is a pre-requisite for all round progress at school and at play (Singer et al, 1995).

The crucial years between the age of 10-12 years are significant nutritionally as during this period the body stores are build up in preparation for the rapid growth of adolescence. Thus, children at this stage need a high calorie intake, a generous supply of good quality protein, minerals and vitamins because of growth and increased activity (Williams, 1980).

Dietary practices of school children: Dietary habits that affect the food preferences are generally developed in childhood (Cutatis and Shannon, 1996). Several studies on the food habits of school children showed that a significant proportion of children do not consume milk, fruits and vegetables on a regular basis (Cavidini et al, 1999; Hurson and Corish, 1997). The regular meals omitted by the children are often made up by snacks. "Snack" is a food not eaten at recognized meal time and the one which makes a minor contribution to the day's intake. Snacks merge on the smaller side into confectionary or candies and on the other into fast foods (Rugg-Gunn et al, 1998; Musgrave et al, 1981). Several studies have reported that school children do not conform to a regular three meal pattern and breakfast and lunch appeared to be the most frequently skipped meals by them (Gross et al, 2004; Court, 1998; Marino and King, 1980).

Importance of breakfast: Several studies have highlighted that there is probably no nutritional substitute for a breakfast. It is the most important meal of the day as it gets children off to a good start, whether they are in school or at home. A good breakfast ensures a good supply of readily usable carbohydrate (glucose) and a subsequent decrease in reaction time and improved performance/ play; blackouts or fainting may occur, if the glucose supply falls dangerously low. Besides, it provides important nutrients (vitamin C, Calcium and Riboflavin) that are usually difficult to compensate in other meals. Breakfast consumption makes a significant contribute to the child's mean daily nutrient intake and the total energy intake remains significantly lower in children who do not consume breakfast (Kruger et al, 2002; Niklas et al, 1993).

In many developing countries (including India), children have a meal before leaving for school and no other food before they return home in the afternoon. In rural areas, children often walk long distances to reach school, many of them on an empty stomach, generally without tiffin and are thus not able to concentrate on their studies with interest and enthusiasm. These children suffer from a syndrome referred to as "**short-term hunger**" which affects their '**Active Learning Capacity**' or ALC i.e. cognitive function and learning achievements. Most of them are easily distracted in the classroom and have problems staying alert and concentrating on the lessons. Hence, much of the teaching effort spent on them is wasted, making them an economic burden for the family and the country (Levinger, 1994).

Current nutritional norms for MDMP

- **Primary classes (Class I to V)**

450 Kcals energy and 12 g of protein which is derived from 100 g of food grains (rice/wheat), 20 g of pulses, 50 g of vegetables and 5 g of oil.

- **Upper Primary Classes (Class VI to VIII)**

700 Kcals and 20 g of protein, which is derived from 150 g of food grains (rice/wheat), 30 g of pulses, 75

g of vegetables and 7.5g of oil.

These nutritional norms can be met by using the following quantities of food items (Table 2.1).

Table.2.1: Current nutritional norms for MDM Primary and Secondary classes

S. No.	Items	Primary	Upper Primary
1.	Food grains	100 g	150 g
2.	Pulse	20 g	30 g
3.	Vegetables (leafy also)	50 g	75 g
4.	Oil & fat	5 g	7.5 g
5.	Salt & Condiments	As per need	As per need

(MDM.nic.in, 2013)

Table.2.2: Coverage of the MDMS: Primary (Classes I-V) & Upper Primary Level (Classes VI-VIII)

Year	Enrolment	Avg. availed MDM	% Availed vs. Enrol.	% Availed vs. PAB app.
2010-11	1169709	731246	63%	81%
2011-12	1152596	784768	68%	87%
2012-13	1161129	767402	66%	93%
Coverage of MDMS: Upper Primary (VI-VIII)				
2010-11	662339	419086	63%	76%
2011-12	668204	448704	67%	90%
2012-13	713378	461884	65%	97%

(MDM.nic.in, 2013)

The trends for coverage of enrolled upper primary school children (VI-VIII) under MDMS are almost identical as these are for primary level. About 65% of the enrolled children have been covered under MDMS during the academic year (2012-13).

3. Rationale of the study

It is an incontrovertible truth that school meal programmes exert a high-quality impact on enrolment and attendance in schools. A hungry child is much less probable to attend school regularly. Hunger drains them of their will and ability to learn. Chronic starvation can lead to malnutrition. Chronic starvation also delays or stops the bodily and intellectual growth of children. Malnutrition adversely influences Universalization of Elementary Education Even if a

malnourished infant does attend school, child finds it difficult to concentrate on and participate in the teaching-learning activities in school. Unable to cope, he would drop out. There is also evidence to advise that apart from bettering college attendance and infant nutrition, mid day meals have a necessary social fee and foster equality. As teens analyze to sit down together and share a frequent meal, one can assume some erosion of caste prejudices and class inequality. Moreover, cultural traditions and social constructions often mean that girls are a whole lot extra affected through starvation than boys. Thus the mid day meal programme can also reduce the gender gap in education, since it enhances female school attendance. With a view to enhancing enrollment, retention and attendance and simultaneously improving nutritional levels among children, the National Programme of Nutritional Support to Primary Education (NP-NSPE) was launched as a Centrally Sponsored Scheme on **15th August 1995**, initially in 2408 blocks in the country. By the year 1997-98 the NP-NSPE was introduced in all blocks of the country. In **October 2007**, the scheme has been further revised to cover children in upper primary (classes VI to VIII) initially in 3479 Educationally Backwards Blocks (EBBs). The calorific value of a mid-day meal at upper primary stage has been fixed at a minimum of 700 calories and 20 grams of protein by providing 150 grams of food grains (rice/wheat) per child/school day. 11.04 Crore children were covered under MDM Scheme during 2009-10. During 2010-11, 11.36 Cr children i.e 7.97 Cr. children in primary and 3.39 Cr. children in upper primary had been covered in 12.63 lakhs institutions. During 2011-12 total coverage of children against enrollment was 10.52 Crore (i.e. Primary-7.71 crore and Upper Primary 3.36 crore children). During 2012-13, 10.68 Cr. children (Elementary level) had been covered in 12.12 lakh Schools. 10.45 Cr. children were covered in 11.58 lakh Schools during 2013-14.

4. Objectives of the study

1. To know the dietary practices of children with special emphasis on breakfast, lunch, dinner consumption.
2. To monitor and evaluate Mid-day Meal programme in both school in terms of hygiene and sanitation practices.
3. To document the records maintained at school regarding MDM and presence of Hawkers outside the school.

5. Method of the study

The data were collected from both the primary and secondary sources. The field study was based on the observations of two government schools in upper primary classes in Delhi in which Mid-Day Meals Scheme was functional. A research observations were done very confidential, to observe meal distribution, and informal discussions with school teachers, , parents, school children were done. Primary data were collected by using interview schedule, observation schedule and focus group discussions. School Management Committee members (implementing agency), community members, parents, teachers, and students were involved in the focus group discussions. Besides this, observation method was also adopted, the availability of the drinking water facility, distribution of the mid-day meal, manners of the children during the time of serving mid-day meals and hygienic conditions in the school premises followed by mid day meal distributor and children . School data on weekly menu, temperature of mid day meal before serving, records maintained by school etc. were noticed. Care was taken to ask questions in a non-suggestive manner, and whenever possible, the accuracy of responses was checked by asking the same question to several people and comparing them with first-hand observation. Since the visit to the schools in which the food was being prepared in the school itself was done while the cook was preparing the school meal, the possibilities of altering its quantity or quality were limited. For secondary data, recent government and nongovernment reports on primary education, government websites, newspaper articles and journals were relied upon.

3. Results and Discussion

3.1 General profile of the subjects

The subjects for this study comprised of 60 children (aged 10-12 years) of which 30 were girls (school A) and 30 were boys (school B) both belonging to similar socio-economic backgrounds. The distribution of children on the basis of age revealed that 37 percent children from school A and 20 percent children from school B were between the age group of 10-11 years, while remaining 63.3 percent from school A and 80 percent from school B were between 11-12 years (Figure 3.1).

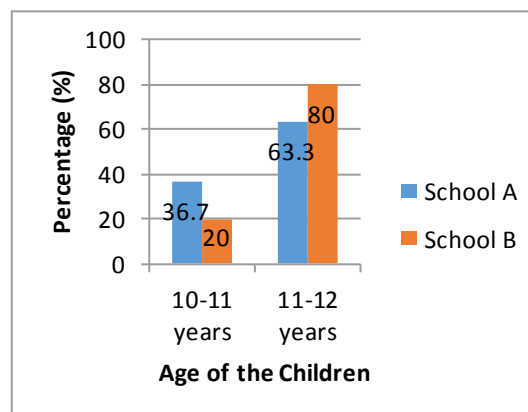


Fig. 3.1: General profile of school children.

The distribution of subjects according to the types of family revealed that majority of children (75%) belonged to nuclear families while 17 percent from school A and 33.3 percent from school B were living in a joint family. With respect to family income the data reported that 20 percent children belonged to families having a family income upto Rs. 4,000 per month; one-third belonged to families earning between Rs. 5,000 and 8,000 per month; nearly one-fourth (26.6%) children had family income between Rs. 9,000 and 12,000 per month while the remaining had family income ranging from Rs. 12,000 to 15,000 (Table 3.1).

Table 3.1: Family type and total income of the family per month

Type of family	School A (n ₁ =30)	School B (n ₂ =30)	Total students (N=60)
Nuclear	25 (83.3)	20 (66.6)	45 (75)
Joint	5 (16.6)	10 (33.3)	15 (25)
Income (Rs/month)			
<4,000	9 (30.0)	3 (10.0)	12 (20.0)
5,000-8,000	11 (36.6)	9 (30.0)	20 (33.3)
9,000-12,000	9 (30.0)	7 (23.3)	16 (26.6)
12,000-15,000	1 (3.3)	11 (36.6)	12 (20.0)

(Figure in parenthesis indicate percentages)

3.2 Mode of commuting to school and time taken

It was leant that a great majority of children walked to school (School A, 73.3%; School B, 90.0%). Only handful students used any form of transport (bicycle/ bus/ rickshaw) to commute and there was no significant difference between both schools (Table 3.2).

Table 3.2: Mode of commuting to school

Mode of commuting	School A (n ₁ =30)	School B (n ₂ =30)	Total students (N=60)
<i>Walking</i>	22 (73.3)	27 (90.0)	49 (81.7)
<i>By bicycle</i>	3 (10.0)	0 (0.0)	3 (5.0)
<i>By bus</i>	3 (10.0)	2 (6.7)	5 (8.3)
<i>By rickshaw</i>	2 (6.7)	1 (3.3)	3 (5.0)

(Figure in parenthesis indicate percentages) $\chi^2 4.04; p < 0.05$

Key: School A - Girls School
School B - Boys School

Further, the children were asked about the **time taken to reach school**. Nearly one third (38.3%) children took less than 10 minutes; one-fifth children reached within 10 minutes and about 40 percent took between 20-30 minutes while only a handful took more than half an hour to reach school. There was a highly significant difference for time taken to reach school between the boys and girls (Table 3.3).

Table 3.3: Time taken to reach school by school children

Time taken to reach school	School A (n ₁ =30)	School B (n ₂ =30)	Total students (N=60)
<i>< 10 minutes</i>	5 (16.7)	18 (60.0)	23 (38.3)
<i>10 minutes</i>	12 (40.0)	0 (0.0)	12 (20.0)
<i>20 minutes</i>	8 (26.7)	7 (23.3)	15 (25.0)
<i>30 minutes</i>	4 (13.3)	4 (13.3)	8 (13.3)
<i>More than 30 minutes</i>	1 (3.3)	1 (3.3)	2 (3.3)

(Figures in parenthesis indicate percentages) $\chi^2 = 19.414; p = .001$

3.3 Dietary practices of school children

In order to understand the dietary practices of school children (N=60) aged 10-12 years, enrolled in two DOE Schools, the questionnaires designed were administered. Similar questions were also asked to parents (N=30) in order to authenticate some of these responses.

3.3.1 Practices of breakfast consumption

The sampled children from both schools were asked about the practices of breakfast consumption before reporting to school (Table 3.4).

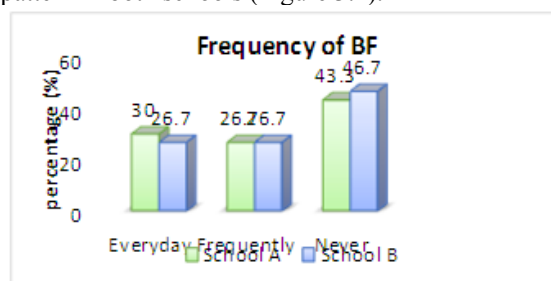
Table 3.4: Practices of breakfast consumption amongst school children

Breakfast consumption Practices	School A (n ₁ =30)	School B (n ₂ =30)	Total Students (N=60)
<i>Always eat BF</i>	9 (30.0)	8 (26.7)	17 (28.3)
<i>Eat BF sometimes</i>	8 (26.7)	8 (26.7)	16 (26.7)
<i>Do not eat BF</i>	13 (43.3)	14 (46.7)	27 (45.0)

(Figures in parenthesis indicate percentages) $\chi^2 .0096; p < 0.05$

BF= Breakfast

It was surprising to note that majority (45%) of children from both schools did not ate breakfast, (~28.3%) consumed breakfast daily. While the remaining (26.7%) had breakfast sometimes. The practice of skipping breakfast is not conducive for learning as indicated in several studies (Ramachandran, 2002; Levinger 1994; Politt, 1990). As regards the **frequency of breakfast consumption**, nearly one- fourth students from both schools consumed breakfast regularly. Further, it was reported that nearly 26.7 percent children in school B and more 30 percent children in school A had a breakfast 2-3 times in a week. While (45.0%) children never ate breakfast. There was no significant difference in the frequency of breakfast consumption pattern in both schools (Figure 3.2).



Frequently: 2-3 times in a week

Fig 3.2: Frequency of breakfast consumption among school children

Lunch consumption pattern

The subjects were also asked whether they consumed **lunch** on reaching home. Nearly two third students (67.8%) replied in the affirmative; about 13.3 percent did not eat any lunch home while about one-fifth students (20.3%) ate lunch once in a while and there was no significant difference in both schools

Pattern of Dinner Consumption

Further, the subjects were also asked regarding their dinner consumption patterns. 84.4 percent children consumed dinner on a daily basis while the rest did not (Figure 3.3).

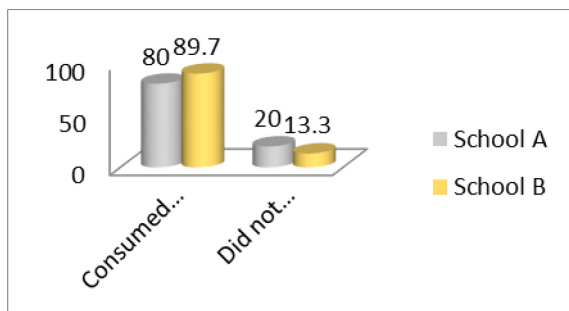


Figure 3.3: Pattern of dinner consumption

The food items usually consumed at dinner were also asked. Rice-Dal was the most commonly eaten (52.9%), followed by Roti-Sabzi (31.6%) and Paratha-Sabzi (21.6%). A substantial dinner comprising of Roti +Dal, Sabzi and salad was being eaten only by a handful students only from school B and there was no significant difference in these practices.

MID DAY MEAL AT SCHOOL

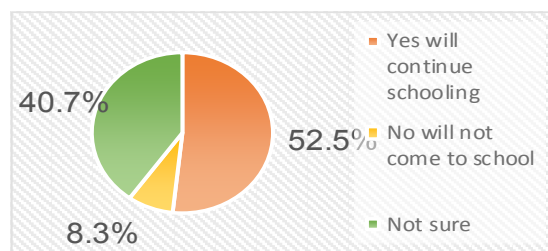
Further, the opinion of sampled children regarding the amount of MDM served was also cited. More than the half of the children were satisfied with the amount of MDM provided; one-third (37.3%) were somewhat satisfied while some boys from school B, (16.7%) did not find the amount sufficient and there was no significant difference in both schools (Table 3.5).

Table 3.5: Children opinion regarding the amount of MDM served

Student's response	School A (n ₁ =30)	School B (n ₂ =30)	Total students (N=60)
Satisfied with amount	18 (60.0)	15 (51.7)	33 (55.9)
Not satisfied	0 (0.0)	5 (16.7)	5 (6.8)
Somewhat satisfied	12 (40.0)	10 (34.5)	22 (37.3)

(Figure in parenthesis indicate percentages) χ^2 4.439; $p < 0.05$

Further, children opinion regarding continuing schooling on event of closure of MDMP was also cited. More than half children (52.5%) reported that they would continue coming to school even if the MDMs will discontinued; only very few (8.3%) reported that would drop school while about 40 percent were not sure (Figure. 3.4).



3. Fig 4: Children's opinion regarding continuing schooling on event of closure of MDMP.

In both schools the menu of the MDMs provided on the working days is as given in Table.3.19.

Table 3.6: Weekly menu served in schools under study

DAY	MENU OF MDMs SERVED IN BOTH SCHOOLS
Monday	Puri- Aloo
Tuesday	Rice- Sambhar
Wednesday	Puri- Chole curry
Thursday	Rice- Chole
Friday	Halwa with Dry Black Chana
Saturday	Rice- Kadhi

Children from both schools were also asked to enlist their favourite MDM. Poori - aloo was the clear favourite (School A, 33.3%; School B, 40%) followed by Poori- Chole and Rice-Kadhi (20%); Sambhar-Rice and Rice – Chole curry were liked by 11.7 percent children only, whereas none of the children from both schools relished dry black chole with suji - halwa as halwa was too sweet and this combination did not provide satiety. Addition of poories could solve the problem as suggested by many students (Table 3.7).

Table 3.7: Children's preference for MDM menus

Most liked meal	School A (n ₁ =30)	School B (n ₂ =30)	Total children (N=60)
Puri-Aloo	10 (33.3)	12 (40.0)	22 (36.7)
Sambhar-rice	3 (10.0)	4 (13.3)	7 (11.7)
Puri-chole	7 (23.3)	5 (16.7)	12 (20.0)
Rice-chole curry	4 (13.3)	3 (10.0)	7 (11.7)
Halwa-with Dry Black channa	0 (0.0)	0 (0.0)	0 (0.0)
Rice-kadhi	6 (20.0)	6 (20.0)	12 (20.0)

(Figure in parenthesis indicate percentages)

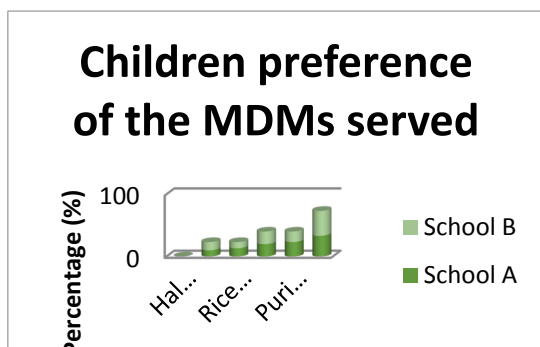


Figure 3.5: Children preference for most liked MDM

Further, these children preferences were also ask to enlist the food - items they would prefer in the MDM. Rajma-rice was preferred by a larger majority (91.6%), followed by *Vegetable Pulao* (85.0%), *Poori- Paneer* and *Chole- Bhature* (83.3%), *Aloo Parantha* (80.0%) and *Kheer* or *Roti- Mix Sabzi* (61.6%) (Table 3.8).

Table 3.8: Food items preferred as mid-day meals

Food items preferred In MDM	School A (n ₁ =30)	School B (n ₂ =30)	Total students (N=60)
<i>Rajma- rice</i>	26 (86.6)	29 (96.6)	55 (91.6)
<i>Vegetable Pulao</i>	24 (80.0)	27 (90.0)	51 (85)
<i>Roti- mix sabzi</i>	20 (66.6)	17 (56.7)	37 (61.6)
<i>Chole- Bhature</i>	25 (83.3)	25 (83.3)	50 (83.3)
<i>Aloo paratha</i>	27 (90.0)	21 (70.0)	48 (80.0)
<i>Puri- paneer</i>	24 (80.0)	26 (86.6)	50 (83.3)
<i>Kheer</i>	15 (50.0)	22 (73.3)	37 (61.6)

(Figures in parenthesis indicate percentages)
(Multiple responses; rows not additive)

Patterns of consumption of MDM in both schools

School Code	Eat full MDM	Eat 3/4 amount	Eat 1/2 amount	Eat 1/4 amount	Ask for more help	Shared with	Take Home
School A	18 (60.0)	2 (6.7)	5 (16.6)	0 (0.0)	0 (0.0)	2 (6.7)	3 (10.0)
School B	15 (25.0)	4 (13.3)	1 (3.3)	0 (0.0)	5 (16.6)	5 (16.6)	0 (0.0)

(Figure in parenthesis indicate percentages)

More girls ate the full MDM (60%) as compared to boys (25%), while more boys (16.6%) shared it with seniors and none of the boys took the food home while 10 percent girls packed it for home consumption.

OBSERVATIONS MADE AT BOTH SCHOOLS

Using a specially designed observation schedule, **observations** were also made in both schools regarding practices of children relating to purchase of snacks/ food items from hawkers/ nearby shops; consumption of MDM / tiffin brought from home, hygienic practices followed by the food handlers, children and the staff distributing the mid- day meals and the temperature of these foods.

Presence of hawkers nearby school

There were few hawkers and a tea stall nearby schools and the food- items were displayed in an unhygienic manner as they were uncovered with many flies sitting on them. These foods included – *chooran / imli*, candies, chewing gums, *rasgulla*, *chole kulchey* etc. It was observed that a greater number of children from school B purchased from hawkers as compared to school A.

Record keeping

Data was collected **record keeping** pertaining to MDMs. It was also learnt from the MDM incharge at school and suppliers that payments were made based on the actual number of children who ate the MDM. Thus, record of daily attendance and total number of meals served was kept by the MDM incharge. The total attendance of the month (and hence the total number of meals served in that month) formed on the basis of the payments being made to MDM suppliers. Almost all the children were getting MDM regularly and on time (in both schools) and whenever meals were leftover, extra helpings were given to the children of secondary classes as they were not entitled to MDMs or sometimes distributed among the helpers. However, on certain days the supply fell short (when attendance was almost full) and then the food (with slightly smaller helping) was strictly served to children only and not to others. Most of the children were seen sharing their MDM with senior students.

Children preference for mdm and its quality

Most of the food items served in MDMP were liked by children and the entire amount served was consumed. Halwa and Dry Black Chana were not liked by .most of the children because Halwa was too sweet and this combination did not provide satiety and students desired Pooris along with this.

It was noted that the **quality** of meal served was checked by teachers and MDM committee constituted in both schools before distributing these among children. Although a parent committee was

constituted (in both schools), but not even single parent took interest in these issues and were never seen present for tasting these foods.

Hygienic and sanitation practices

➤ **Hygienic practices of the personnel** were also observed using an observation schedule. Although the containers of this meal were properly sealed (when brought to schools), but they were distributed in an unhygienic manner. Ladles for portioning/ serving were not very clean, food container were kept on the ground / floor and since no plates and spoons were provided by the school, children often brought unwashed or dirty tiffin boxes to eat these meals and carry back to home whatever they could not finish. Neither the distributors nor the children washed their hands before and after distributing/ eating the MDM. The staff engaged in distributing the MDMs did not wear any apron, head gear or gloves while distributing these meals. The server often reported in dirty clothes and was generally seen distributing MDM with uncovered hair. It was observed by the researcher (on all the visits) that although the distributors did not follow any kind of personal hygiene practices but when ever they realized that researcher was around, they become conscious and would immediately wash hands, wore a clean gloves etc and also provided disposables (like spoons and paper plates) to those children who did not carry tiffin boxes/ plates from home.

➤ **Temperature of food being distributed as MDM** was also checked regularly for one week in the schools under study. None of the foods served as MDM was above 63 °C and were in the temperature range of 40 °C to 49 °C. It was learnt from the suppliers that the MDM preparation started around 4-5 a.m. in the central kitchen and the cooked MDMs were distributed around 10:20a.m even though recess was from 11 a.m. Thus, the cooked food were below the safe temperature (65°C) and were kept at that temperature for atleast 5 hours besides these were also being transported in non-refrigerated vans, were not reheated in schools and were being distributing in an unhygienic manner. All these conditions practices can lead to food contamination.

Table. 3.28: Temperature of MDMs served in a week

Day	Menu	School A	School B
Monday	Poori	Not recorded	
	Aloo sabzi	45 ⁰ C	41 ⁰ C
Tuesday	Sambhar	47 ⁰ C	45 ⁰ C
	Rice	42 ⁰ C	40 ⁰ C
Wednesday	Poori	Not recorded	
	Chole	45 ⁰ C	41 ⁰ C
Thursday	Rice	43 ⁰ C	41 ⁰ C
	Chole	45 ⁰ C	43 ⁰ C
Friday	Halwa	45 ⁰ C	42 ⁰ C
	Black chana	49 ⁰ C	46 ⁰ C
Saturday	Rice	43 ⁰ C	40 ⁰ C
	Kadhi	46 ⁰ C	44 ⁰ C

➤ **Drinking water and toilet facilities:** School A had proper toilets on each floor with adequate water supply for washing hands in the wash basins and also in the flush. Teachers had two separate toilets while there were four toilets for students. School A also had one water cooler for drinking water. There was no proper toilet facility in school B and it had only a temporary toilet which not kept clean. There was only one toilet (for both teachers and students) with a poor water supply for flushing as well as washing hands. Besides, there was also a shortage of drinking water (with no water cooler) in school B, and the children, teachers and parents were frequently complaining about these issues.

Discussion with teachers and parents

➤ **Discussion with teachers** revealed that most teachers stressed upon the importance of eating breakfast. On asking the approximate number of children carrying tiffin to school, a great majority (90%) from school A, brought tiffin while in case of school B, only half brought it. Further, almost all teachers from both schools encouraged them to get packed tiffin. Almost all the teachers from school B reported that most children purchased eatables from hawkers on a daily basis even though they did not seem to think that these food items were hygienic. However, fewer children from school A were seen making these purchases.

Teachers from both schools reported that there has been a positive impact of mid- day meals on enrollment, health status and that the children seemed more attentive, playful, active and regular. Most of the children relished the mid-day meal served while only about one- fourth

parents from school A discouraged their children from eating MDM as they were not satisfied with the quality and were particularly concerned after hearing about the death of 22 children in Bihar 2013 as reported by MDM incharge of both schools.

The teachers were asked whether the MDM was means to supplement the usual diets of children or substitute a meal. It was surprising to note that only 60 percent in school A and almost all teachers school B knew that MDM were meant to supplements dietary inadequacy while the others felt that it was substitute breakfast or tiffin. However, it was encourage to note that provision of hot cooked meals at school as it would improve the health of children, particularly those from the lower socio-economic group.

➤ **Mother's perceptions / opinion regarding the cooked mid- day meals**

Only handful parents from both had seen or tasted the cooked mid- day meal being served to their children; A great majority mothers (90%) from both schools felt the meal provided in school was a good (being provided free of charge by the government) for children but did not understand that it was meant to supplement the dietary inadequacies in their daily diets and not substitute any home meal. It was interesting to note that none of the parents knew about the source of supply of these MDMs.

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