Mid Day Meals and School Attendance

(A study of Delhi government schools)

(1) Introduction

Under the right to food campaign, midday meal was one of the first achievements of the Government of India. The Mid day meal programme aims at providing 450 calories and 12 grams of protein for students till class V and 700 calories and 20 grams of protein for students till class VI-VIII. In Delhi, in order to ensure that the quality of food provided is up to the standard, authorities have entrusted the work of providing cooked food to 27 NGOs or Service Providers where food is being cooked in their 29 semi-automated kitchens.

The MDM Scheme was implemented across government schools in India "with a view to enhancing enrollment, retention and attendance and simultaneously improving nutritional levels among children" (as given in the HRD Ministry website). This program could influence families living in abysmally poor conditions to send their children to school, as this would ensure one proper meal per day for the child.

According to the Human Resource Department approximately 12crore children across India benefited from this scheme during 2009-10. An amount of almost Rs10,000 crore was spent on the scheme during 2011-12.The huge numbers involved beg for a study on whether the scheme has achieved its objectives.

The following study focuses on the objective of the MDM Scheme to enhance attendance. School attendance in government schools may depend on a lot of factors other than the basic objective of attaining education. Attending school for some children is almost like an option, since they need to work to supplement low family incomes, take care of younger siblings at home, or miss school for other such reasons.

This paper investigates whether attendance is influenced by the choice of students to eat midday meal, and by the quality of the meals as judged by the students, controlling for various socio-economic factors. The variables used in this analysis include quality of midday meals provided, as rated by the students, wealth and education information of their households, and several indicators of school infrastructure.

The rest of the paper is organized as follows. The next section describes briefly some existing literature on midday meals and determinants of school attendance. Section 3 describes how the data was collected and is followed by some preliminary results. Section 6 contains the results of regressions based on the data and the final section concludes.

(2) Literature Review

There is extensive literature regarding the mid day meal scheme in India. Reetika Khera (2002) provides evidence of rise in enrolment at the primary level in Rajasthan after the mid day meal programme was introduced. Dreze and Goyal (2003) point towards the quality issues that need urgent attention for mid day meal scheme to reach its full potential. Our work also incorporates findings from literature relating to school attendance. Usha Jayachandran (2002) postulates that school attendance is positively related to school accessibility, female workforce participation and parental education, and negatively related to poverty and household size. Leonardo Grilli(2008) finds that children of working mothers have a lower probability of attending school. Coming to specifically the impact of mid day meals to school attendance, Farzana Afridi (2010) notes that program transition from monthly distribution of free food grains to the daily provision of free cooked meals to school children had a significant impact on improving the daily participation rates of children in lower grades. Our study is an analysis based in an urban setting, Delhi and focuses on students of higher classes, 7th and 8th.

(3) Data

Data was collected by interviewing 365 students from the 7th and 8th standards of 12 randomly selected government senior secondary schools sprawled across 8 districts of Delhi, namely North, North East, North West, Central, South, South West, East and West Delhi.

The explained variables of the analysis are students' attendance and their academic performance. To find how well these variables are explained by the choice to participate in the MDM programme and socio-economic factors, we collected data on the quality of midday meals as perceived by the students, household characteristics of students, infrastructure available in school, and the general environment at school.

Students were given attendance scores for the months of April and May by their schools. These were used to calculate percentages for attendance scores, which were then used to draw inferences.

Academic performance was measured by scores obtained by students in the previous academic year (2011-2012), taken in percentages. Implicit in the analysis is the assumption that students who took part in the MDM Scheme in the current year, also did the previous year.

Data on midday meals includes information on whether students ate the midday meals or not, whether it tasted better than normal, home-cooked food, how they rated the food (on a scale from 1 to 5), and whether they had ever fallen sick due to bad quality of the food.

The secondary variables we investigated relate to the household structure. Size of the household as well as education of parents may influence the everyday decision of sending a child to school. The wealth of the household may affect the overall environment at home, influencing a child's regularity in attending school. This could be true for an urban setting, like Delhi where meals, as such, are not a big reason for sending students to school.

To assess the wealth variable, a list of 14 assets was made (television, bicycle, mobile phone, sewing machine etc.). Students responded on the number of assets from those listed, present in their homes.

Infrastructure available at school may also influence attendance. Better infrastructure and smaller class sizes are conducive towards providing better education, along with improving the likability of school from a child's perspective. Other factors such as bullying and the increasing popularity of taking home tuitions have also been taken into account.

The data on infrastructure included a school-wise assessment of quality of wash rooms, availability filtered drinking water, facilities for sports and general cleanliness.

(4) A First Look

Out of the students interviewed-

- 69% said that they ate the midday meal provided at school
- 58% said that they brought home-cooked food to school, which means that some of the students who ate midday meals did not do so regularly.
- Around 7% of the students said that they enjoyed eating the midday meal more than food made at home on a normal day.
- 21% of the students reported falling sick because of bad quality of food provided at school.

A short summary of the other data collected is given in Table 4.1 and Table 4.2. Average attendance was found to be just below 75%, very low for school students. Since students up till the 7th grade are compulsorily promoted to the next standard, irrespective of exams score, the average scores were also found to be quite low. Average asset ownership of households was around 7.

Table 4.1

	Average	SD	Min	Max
Attendance (%)	74.20	24.44	0	100
Exam score (%)	52.05	11.48	20.5	96
Number of siblings	2.31	1.52	0	9
Siblings studying	1.73	1.16	0	5
Siblings not studying	.58	.97	0	5
Wealth index	7.13	2.28	1	13
Class size	55.64	16.8	27	92

A quarter of the respondents' mothers were working, most of whom were self-employed. Corporal punishments and bullying by school-mates were reported by as many as 47% and 43% of the students respectively. Both were found to be much more frequent in boys' schools than in girls' schools.

Table 4.2

Percentage of students reporting-	
Mothers working	25
Corporal punishments	47
Bullying	43

Taking tuitions	57

The state of infrastructure in most of the 12 schools surveyed was rather gloomy, general cleanliness of classrooms and toilets being the most pressing issues.

Table 4.3

Number of schools with-	
Usable toilets	8
Filtered drinking water	6
Sports ground	9
Sports equipment	6
Regularly cleaned classrooms	7

(5) A Preliminary Analysis

What follows is a general analysis of variations in responses to questions related to the midday meals.

FINDINGS:

Around 30% of the students we interviewed did not eat the food offered at school. But the difference in average attendance of those who ate at school, and those who did not was not found to be statistically significant (Table 5.1). To check whether the students in the two groups came from very different socio-economic backgrounds, we checked if there was any significant difference between their average asset ownership indices or between their average family sizes. No significant difference was found in either. In addition to this, we did not find a significant difference in the eating decision of students with working mothers and non-working mothers.

Table 5.1

Variable	Attendance (%)	|Difference|
Students who eat MDM	73.4	2.6
Students who don't eat MDM	76	
Students who have fallen sick due to MDM	75.4	5.7
Students who have never fallen sick	69.7	

*Significant at the 10% level   ** Significant at the 5% level

Therefore, at a first glance, we find that groups of students who eat midday meals and those who do not, come from fairly similar backgrounds. Thus, the decision to attend school on any particular day does not seem to depend on the decision to eat midday meals.

Around 20% of the students reported falling sick due to bad quality of the food. There was no significant difference between the average attendance of those who fell sick and those who did not. It was found that 83% of the students who had fallen sick due to the bad quality of midday meals still continue to eat at school.

The students were asked to rate the quality of the midday meals from 1 to 5. Average rating was found to be 3.3. The distribution of how the students rated the quality is given in Figure 1.
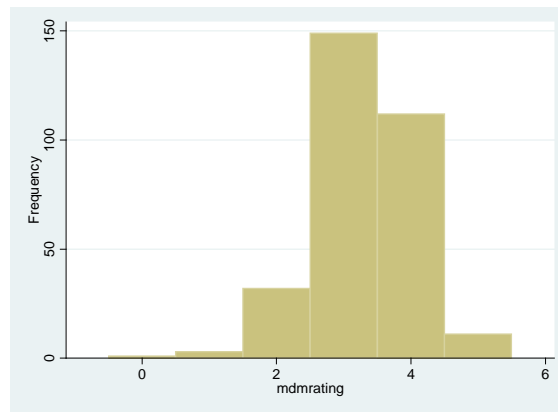
Figure 1

A large number of the students gave the food a score of 3 or 4. It is interesting to notice that the density of students rating the food as average or good is quite high. Even the number of students who find the meals very good is more than the number of students who find the quality very bad.

The average attendance percentages of students giving different scores are given in Table 5.2. We tested the significance of the difference in attendance percentages among those who gave the meals a rating of 1 and those who gave it a rating of 2, those who gave it a rating of 1 and those who gave it a rating of 3 etc. None of the pair-wise differences between attendance percentages are significant.

Table 5.2

Rating	Number of Students	Average Attendance
1	3	60.87
2	32	72.77
3	149	74.73
4	112	76.52
5	11	69.14

Other subsidiary results that we found with respect to socio-economic factors are listed below (see Table 3.3)

Gender: On average, girls attend school more regularly than boys, and perform better in exams.

Education of parents: students whose mothers had received education till at least the primary level, on average, did not attend school more than students whose mothers had not. The average attendance percentages of both groups are around 74%. But we found that students with more educated mothers performed better in exams, which was expected. It was found that father's education had no impact on students' attendance and scores.

Occupation of mother: the mothers of 25% of the students we interviewed were employed. The average attendance percentage of these students was 70%. Attendance of those with non-working mothers was 77%. The difference is significant at the 10% level. Average scores of students with working and non-working mothers were 50% and 57%.

Class size: the average class size in the schools surveyed was 55 students. The average attendance of students in classes with less than 55 students was 76.6%, while that of students in classes with more than 55 students was 71%. The difference is significant at the 5% level. Average scores of the two groups were 53.44% and 50.45% respectively. The difference is significant at the 5% level.

Infrastructure: Relative to the average, we found that students in schools with a greater infrastructure index attended school more regularly than others.

Bullying: Almost 70% of students in boys' schools report the existence of bullying. The corresponding figures for co-ed schools and girls' schools are 44% and 21% respectively. Average attendance of those who report bullying is 70% and that of those who do not, is 79%. The difference is significant at 5% level of significance.

Attitude of teachers towards the students: 71% of students in boys' schools, 28% in girls' schools, and 55% in co-ed schools have been beaten by a teacher. Amongst all girls and all boys, percentages of students who have been beaten at school are 29% and 70% respectively. Mean attendance for children who were beaten at school is 71.34% and for those who were not is 77.02%. The difference is significant at the 5% level.

Table 5.3

Variable	Attendance (%)	|Difference|
Boys	69.6	8.5**
Girls	78.1	
Educated Mothers	73.9	0.6
Non-educated Mothers	74.5	
Working Mothers	69.9	6*
Non-working Mothers	75.9	
Large Class	70.9	5.7**
Small Class	76.6	
Good Infrastructure	76.6	7.2**
Bad Infrastructure	69.8	
Bullying	70	9**
No bullying	79	
Corporal Punishments	71.34	6.78**
No Corporal Punishments	77.02	

*Significant at the 10% level   ** Significant at the 5% level

(6) **Regression**

The relationship this study attempts to establish is represented by the following regression-

Attendance= f(MDM variable , gender, class size, bullying in school, student's siblings going to school or not, mother's education, mother's working status, school infrastructure , wealth, academic performance)

Attendance percentage: This variable is a percentage of the number of days the student attended school in the months of April and May over the total number of school working days in the given months.

Explanatory variables and a priori expectations:

MDM variables: It was expected that those who benefit from the MDM Scheme would attend school more, but our preliminary results do not show any such relationship. We have taken into account two MDM variables in two different models.

The decision of students to eat or not to eat the food provided at school. The variable is a dummy, taking a value of 1 if the student participates in the scheme, 0 otherwise. The use of this variable will capture the influence, if any, of the provision of the scheme on school attendance.

In another specification, we use the ratings of midday meals given by the students. These ratings are taken as a proxy for the quality of the food provided. The variable is used in a different specification because it tells us whether students attend school more or less according to how well they rate the food. Most of the students who choose not to eat at school have not rated the food.

Gender: A dummy variable, gender that gives a value 1 for boys and 0 for girls. This variable would pick up the effect of gender. On the basis of preliminary results, the coefficient should be negative.

Class size: This variable gives numerical values to the number of students enrolled in each class. There are two possibilities to gauge the average attendance on the class size

A larger class size will imply a lower teacher to student ratio, thereby reducing the efficiency of teaching and classroom activities. Due to this, students get less personal attention and have lesser incentives to come to school. This will have a negative effect on average attendance.

A larger class size gives rise to incidences where a student may avoid punishment by simply not being noticed. In turn if the student has not finished the assigned work then he/she will still attend the class. This would result in a positive effect on average attendance

Problem of bullying in schools: This dummy variable assigns value 1 to students who have been subjected to bullying by their classmates or seniors and 0 otherwise. Bullying by seniors or classmates creates an uncomfortable environment in school so we expect to find a negative relationship between this and attendance percentages.

Students' siblings going to school: This variable was created by calculating the proportion of children in the age group of 5 to 20 years going to school/college out of the total number of children in the above age bracket, including the respondent. The reason for including this variable is that school attendance may depend on whether the family values education or not, which may be reflected in whether all children are sent to school (or college).

Mothers' working status: This dummy variable assigns value 1 to mothers who are working and 0 otherwise. This variable tries to understand the relation between attendance and mothers working status: There is a set of two possibilities:

Firstly, if the mother is not working and staying at home she would be able to give more time to her child daily and would be able to keep track of the progress the child makes at school. This will create a positive environment for child in terms of education. Secondly, the presence of mother at home reduces the household work which may have otherwise been borne by the child. This could occur more for girls whose mothers are working. Therefore mothers not working will have a positive effect on average attendance.

If mothers are working they will add to the family income and wealth of the household. This creates a positive environment for the child to take up education seriously.

Mother's education: We have used dummies for students whose mothers have received education at least up to the primary level (mother education 2), till class 12 (mother education 3), and up to graduation or up (mother education 4). We expect to find children from families with more educated mothers to attend school more often.

Infrastructure Index: this index was constructed by incorporating information on 5 factors-

- Whether the toilets are usable and functional: A value of 1 is assigned for positive response otherwise 0
- Whether the water available at school is purified: A value of 1 is assigned for a positive response, 0 otherwise
- If there is a sports ground in school: A value of 1 is assigned for a positive response, 0 otherwise
- Whether sports equipment (badminton, cricket bats, balls) is provided by school: A value of 1 is assigned for a positive response, 0 otherwise
- Whether the classes are clean on a daily basis: A value of 1 is assigned for a positive response, 0 otherwise

Wealth: The number of assets owned by the family is used as a proxy for wealth and designated as the 'Wealth Index'. Higher value of this variable indicates a more favourable environment at home that encourages a student to attend school regularly.

Interaction between gender and class-size: In addition, we added an interactive variable between class-size and gender to see whether a larger class-size had different effects on the attendance of girls and boys.

We have not used corporal punishment in either specification. The students always justified why they were beaten/ scolded by their teachers, and corporal punishments are considered necessary in most schools. Therefore, this variable may not explain variations in attendance to a large extent.

Regression Results

Table 6.1 gives the results of estimating the functional relationship described above. This model has the decision to eat midday meals by the students as the MDM explanatory variable.

Table 6.1

Attendance percent	Coefficient	P>t	Coefficient	P>t

	Coefficient	P>t	Coefficient	P>t
Gender	-25.1711	0.0460	-23.6194	0.0800
Wealth	0.1138	0.8390	0.5689	0.3750
Mdm rating			1.0556	0.5420
Mdm decision	-1.0158	0.7110		
Class size	0.0073	0.9630	0.0799	0.6450
Scores percentage	0.6180	0.0000	0.6598	0.0000
Bullying	-1.3376	0.6550	-1.5155	0.6390
Mother work	-3.4564	0.2390	-3.1236	0.3260
Fraction of children going to school	17.3731	0.0360	17.5543	0.0540
Infrastructure index	4.4973	0.0000	4.2980	0.0000
Interaction of gender and class size	0.2773	0.1880	0.2178	0.3360
Mother education 2 & 3	-1.7978	0.5180	-1.4659	0.6210
Mother education 4	-7.5402	0.3240	-6.7958	0.4730
_cons	18.4125	0.1830	7.0209	0.6620
No of observations	296		253	
Adjusted squared R	0.1913		0.1906	

Inferences:

The coefficients of the MDM variables in either specification are not significant. We find that the choice of eating the midday meal does not influence the attendance of school going children in Delhi. Whether the children find the quality of the food good or bad also does not seem to matter.

The coefficient of gender is negative and significant at 10% in both the specifications. This was expected as girls were found to be far more regular to school than boys.

The most important result is that of the positive and significant coefficient of the infrastructure index. This may have important policy implications; if the government wants to increase school attendance, it should spend more funds on improving basic infrastructure provided at schools.

The diagnostic tests for heteroscedasticity and muti-collinearity were run and no such problems were observed. The inclusion of scores as an explanatory variable in the above regression may result in an endogeniety problem as scores may, in turn, be influenced by attendance. To circumvent this issue, we divided our dataset in two on the basis of scores, with students who scored less than the median in one set (Quantile1), and the rest of them in the other (Quantile2). We then ran the same regressions as above, with the difference that the scores were not entered as explanatory variables.

The results are given in table 6.2 and 6.3

Table 6.2

	Quantile 1		Qunatile 2	
Attendance percent	Coefficient	P>t	Coefficient	P>t
Gender	-26.6756	0.2610	-23.6016	0.1640
Wealth	0.1542	0.8830	0.9357	0.2690
Mdm rating	2.2911	0.4000	0.4855	0.8390

	Coefficient	P>t	Coefficient	P>t
Class size	0.1678	0.5510	-0.1454	0.5240
Bullying	-1.1108	0.8320	-2.7161	0.5230
Mother work	-1.9888	0.6950	-6.4518	0.1540
Fraction of children going to school	17.9974	0.2450	24.2572	0.0440
Infrastructure index	5.9850	0.0000	2.2298	0.1080
Interaction of gender and class size	0.2464	0.5200	0.2893	0.3280
Mother education 2 and 3	-0.4101	0.9360	-1.3464	0.7230
Mother education 4	-11.4388	0.5370	-7.0721	0.5150
_cons	23.5494	0.3200	57.0639	0.0070
No of observations	128		125	
Adjusted squared R	0.0771		0.0631	

Table 6.3

	Quantile 1		Quantile 2	
Attendance percent	Coefficient	P>t	Coefficient	P>t
Gender	-37.2301	0.0990	-17.9110	0.2480
Wealth	-0.4559	0.6080	0.5418	0.4760
Mdm decision	-3.2106	0.4820	-0.2364	0.9450
Class size	-0.0505	0.8420	-0.0372	0.8600
Bullying	0.1163	0.9810	-2.1118	0.5860
Mother work	-3.4522	0.4510	-5.9039	0.1520
Fraction of children going to school	15.7704	0.2360	30.2453	0.0090
Infrastructure index	6.7739	0.0000	2.4140	0.0630
Interaction of gender and class size	0.4828	0.1780	0.1784	0.5110
Mother education 2 and 3	0.0430	0.9930	-3.5763	0.3140
Mother education 4	-14.3322	0.4240	-5.8307	0.4730
_cons	46.0473	0.0190	50.2509	0.0050
No of observations	147		149	
Adjusted squared R	0.1016		0.0582	

The coefficient of infrastructure is still significant in both the specifications.

(7) Conclusion

Our results suggest that the choice of a student eating Midday meal has no effect on attendance. The availability of good school infrastructure is an important determining factor of attendance. This has important policy implications; if the government wants to increase school attendance, it should spend more funds on improving basic infrastructure provided at schools.

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