School Record or Head-count: What to Believe in Counting Attendance for Primary School Children in Bangladesh?

Mohammed Helal Uddin*

Abstract

Overstating of attendance by school authorites seems widespread in Bangladesh. To show their success school authorities often cook up the figures on attendance. Another likely reason for such exaggeration of maintaining 85 percent attendances is for the students receiving government stipends (known as 'upobrritti'). On an average, a 15.1 percentage points lower attendances in 468 schools and 17.6 percentage points lower attendances in 150 schools due to headcounts cannot be explained with a lower than normal presence during headcount or the class visits. For an average 15.1 percentage points lower attendances in 468, the difference is 18.3 percentage points lower for the control schools whereas it is 14.6 percentage points for the intervention schools. Relatively greater exaggeration of registry attendances by the control is the possibility because there are fewer counterchecks for them. For intervention schools, be it biscuit or meal, there is a third agency to match class presence with the packets of biscuits distributed or the number of meals cooked. These places pressure on them not to exaggerate much. The systematic bias in attendance exaggeration in school records conceals the impact estimation on attendances.

In the context of 468 schools under biscuit intervention, we calculate impact based on difference-in-difference of mean attendances across the intervention and the control schools. We obtain decrease in attendance by 0.8 percentage points due to biscuit intervention. The same estimate is increase in attendance by 1.9 percentage points due to biscuit intervention when we construct it based on headcounts. The impact of the intervention is 2.1 percentage points of greater attendance for the biscuit feeding schools when multivariate adjustment is made. In the context of 150 schools under meal as well as biscuit intervention, we obtain a 1.5 and 0.4 percentage points of improvement in attendance due to biscuit and meal intervention, respectively. To the contrary, we obtain 11 and 6 percentage points of improvement in attendance based on headcounts due to biscuit and meal intervention, respectively. The impacts are 8.5 and 5.7 percentage points of improvement in attendance based on headcounts due to biscuit and meal intervention, respectively, when multivariate adjustment is made.

Key Words: Primary attendance, headcount vs. school registry, school feeding, biscuit vs. meal, children of poor households

*The author is an Associate Professor of the department of economics at the University of Dhaka. The paper uses the report titled "The Impact of School Feeding Program in Bangladesh" by Mohammed Helal Uddin as source material. The report has been prepared for the World Food Programme of United Nations, funded by the Government of Bangladesh. The opinions expressed here do not represent any of the organizations the author is affiliated with. Contact: helalum@yahoo.com

Introduction

School feeding (SF) program is one of the steps the government of Bangladesh has undertaken to improve education outcomes of our young population. SF program has targeted improvements on school enrollment, attendance, retention, completion and dropouts for school-aged children through providing 75 grams of fortified biscuits to a student for every school day. The program which primarily focuses on the poverty-prone areas also intends to improve learning outcomes by alleviating short term hunger and improving children's nutritional status. Another variant of such activity, hot meal or khicuri, has been introduced (as pilot project) in some parts of Bangladesh with similar objectives. To track the outcomes of the intervention, the World Food Programme (WFP) of United Nations Country Office commissioned several studies in different years. These studies assess the education and nutrition outcomes of the SF activity in different parts of Bangladesh. Yet, it could not be established in earlier studies that intervention school outperforms control schools on education and nutrition outcomes. The most striking observation is no positive effect of intervention on attendance.

Description of School Feeding Programs in Bangladesh

The government of Bangladesh started a national school feeding program in September 2011, with technical support from WFP. The program supported 55,000 students initially and reached 2.53 million children by in 2016. The SF program is being implemented with the overall guidance and supervision of the Ministry of Primary and Mass Education (MoPME). The Directorate of Primary Education (DPE) is implementing the program at field in cooperation with NGOs. The program provides a 75g packet of biscuits to primary students and a 50g packet of biscuits to pre-primary school children six days per week. The biscuits provide 338 kcal per day to primary school children, and 225 Kcal/day to pre-primary school children to meet 67 percent of their daily micronutrient requirements. WFP launched a pilot initiative with cooked school meals in collaboration with MoPME and DPE in October 2013 to explore opportunities and modalities within school feeding. The hot meal (Khuchiri) is made of fortified rice, enriched with folic acid, iron, zinc and vitamins A, B1 and B12; fortified oil; pulses; as well as leafy and non-leafy vegetables. At the beginning, a meal used to be composed of 80 gm rice, 25 gm dal, 25 gm oil along with vegetables. Later in September, 2015, rice was raised to 90g and oil was reduced to 12gram.

Methodology and Data

Two sets of data are used for this analysis. One for biscuit intervention on 312 schools along with 156 control schools and thus 468 schools altogether. This intervention has longer time span than the other to be explained here. The other for biscuit intervention on 50 schools, meal intervention on 50 schools along with 50 control schools and thus 150 schools altogether. Basically this intervention is meant only for meal piloting. To compare with biscuit intervention with respect to its effectiveness and impact, samples were drawn for biscuit schools already under intervention. Obviously, the target of this intervention is meal

piloting. Meal program covers 99 schools of which 65 are from Barguna district and the rest 34 from Jamalpur district. Of them, 50 percent, i.e., 50 schools are randomly selected for the survey. Of the selected schools, 32 are from Barguna and the rest 18 from Jamalpur. The control unions/upazilas are selected as matching sites based on similar poverty and VAM classifications. In other words, the control unions/upazilas are selected because they shared the same set of socio-economic characteristics used by VAM to define vulnerability levels for program coverage. Then 50 biscuit schools and 50 control schools were randomly chosen from the provided lists. Students were chosen from the school registry of April of 2016 randomly. Thus, 32 students were chosen from each school, 8 from each class (grade I-IV) and then we followed them to collect information on their households.

One problem with this second set of evaluation study is that no baseline data is available against which to compare the outcomes analyzed in this evaluation. We need to have baseline for both control and intervention ideally. Though we do not have baseline for any of them. This limitation restricts us in applying the difference-in-difference (DID) or double difference estimator generally used in such studies. In fact, we have baseline for 468 schools but without headcount attendances for baseline. As a result, the ongoing study uses cross-sectional controls of the relevant indicators to estimate differences between the intervention and control schools and households for both biscuit and meal interventions.

Since schools did not have any choice on their own to be feeding or non-feeding schools there is no justification for the presence of strong selection bias in this case. Therefore, complication in estimation methods to take care of selection bias is not required. A simple Ordinary Least Square (OLS) estimation with proper specification will do the job here. Coefficient of intervention status shows the impact of intervention on the relevant outcome.

Results and Discussions

Attendance rate is calculated based on the information we collected from school registry as well as headcounts obtained during class visits. The attendance rate is the ratio (expressed as percentage) of the average number of students present in a class to the total number of registered students in that class. The average is taken from over a month. The headcount attendance rate is the ratio (expressed as percentage) of students present in a class during class visit to the total number registered students in that class.

Information on attendance is collected from sampled schools following two procedures. First, we have counted the number of students present in each class during our school visits. There are roughly 750 (=150x5) observations on class attendance, one for each class. Obviously, we collected this head-count attendance only for one day in a school. Schools were surveyed in a span of one month and thus the head-count attendances cover the variation of a month.

Second, the figures on attendance are obtained from the registry books of the sampled schools. Here school registry attendance for 2016-17 is computed based on weighted average attendance of April 2017 and September 2016. It is worth mentioning that 10 schools (three comparison, 4 biscuit and 4 meal schools) were excluded from attendance

estimation because these schools could not show their school registry for the year 2012 and 2013. To make figures comparable we need to compare attendances on the same set schools. Then if we contrast average school registry attendance of 2016-17 to that of 2012-13, we can compare over time changes in attendances across groups and then the difference in difference of attendances as impact of intervention.

Impact of school feeding on attendance - 468 schools

We estimate impact on attendance based on information obtained from school records as well as headcounts. We find strikingly different impact estimates for two different sources of information. We estimate impacts from two sources and then compare their magnitudes. At last we use analytical justification for choosing one or the other. At first, we estimate the impacts for 468 schools based on school records, and then the same based on headcounts. Then compare them to conclude.

Impact Based On School Records

Hardly any dominance of intervention over the control is observed in case of attendance based on school records. Rather we observe a slight edge of the control over the intervention schools. This is evident for girls, boys and all combined (Table 1). The greater attendance of the girls and boys of the control schools over the intervention counterparts are statistically significant at 5 percent and 1% level, respectively. It is statistically significant at the 1percent level for the entire sample.

Table 1: Attendance Rates Over Time Across Gender

		2012	2014	2017	Head count	Difference (Registry-headcount)
Control	Boys	89.3	86.8	90.2	70.2	20.0
	Girls	90.8	88.7	91.9	75.1	16.8
	All	**90.1**	**87.8**	**91.1**	**72.8**	**18.3**
Intervention	Boys	88.3	88.9	87.9	71.7	16.2
	Girls	89.7	90.4	90.5	77.5	13.0
	All	**89.0**	**89.7**	**89.2**	**74.7**	**14.6**
Entire 468 schools[1]				**89.9**	**74.8**	**15.1**

In case of inter-temporal differences we observe dominance of the control schools. Over 2012-17 periods the attendance rate increased by 1.0 (=91.1-90.1) percentage points for the control schools whereas the corresponding rate increased by 0.2 (=89.2-89.0) percentage points for the intervention schools. This will imply impact of intervention on attendance as negative -0.8 (=0.2-1.0) percentage points. That is, decrease in attendance by 0.8 percentage points due to intervention.

1. Of 468 schools, 33 do not have information on either headcounts or registry and thus dropped from the sample when this table has been constructed.

Impact Based On Headcount

When we look into the attendances based on headcount then the picture becomes entirely different. The figures based on headcounts are provided in the penultimate column to the right of the table above (Table 1). Headcount attendance provides us with an insightful dimension even though we have headcount attendance for 2017 only. If we consider the difference of headcount attendances across groups then we find dominance of intervention schools over their control counterparts. Intervention attendance rate is 1.9 (=74.7-72.8) points higher than the control. The difference is the highest for girls which is 2.4 points. If we look into the differences of headcount attendances with registry based attendances for 468 schools (irrespective of control or intervention) then difference are 15.1 points. The difference is statistically significant at the 1% level.

We do not have headcounts for earlier periods and thus we cannot construct inter-temporal difference. But we see greater attendance for intervention schools implying positive impact at least.

Impact of school feeding on attendance - 150 schools

The following sub-sections explain the development for 150 schools. The analysis here will focus not only on biscuit intervention and impact assessment but also on meal intervention and relevant aspects. As mention earlier, we cannot derive inter-temporal differences in attendances based on headcounts due to lack of baseline. But we will exploit cross-sectional variations as much as possible.

Impact Based On School Records

If we consider attendance based on school registry the picture of impact is similar to what we have observed in case of 468 schools. From Table 2, we clearly see that there are improvements in attendance over the 2012-13 to 2016-17 for both girls and boys and for all the three (comparison, biscuit, and meal) groups of schools. For the girls, the increases are 2.6, 4.1, and 1.1 percentage points for comparison, biscuit and meal schools. For the boys, the increases are 1.3, 2.9, and 2.3 percentage points for comparison, biscuit and meal schools. Obviously, the increases are greater for the girls than the boys for the comparison and biscuit schools. The increase is greater for boys than girls for the meal schools.

Table 2: Attendance (%) based on school records

	Comparison			Biscuit			Meal		
	Girls	Boys	All	Girls	Boys	All	Girls	Boys	All
Registry 2016-17	88	86	87	89	86	88	88	86	87
Registry 2012-13	85	85	85	85	83	84	87	84	85
Difference	2.6**	1.3	2.1*	4.2***	2.9***	3.6***	1.1	2.3**	1.7*

The overall increases are 2.1, 3.6, and 1.7 percentage points for comparison, biscuit and meal schools over the periods. Here we can attribute the difference of differences of attendances across groups as impact of intervention. Thus, a 1.5 (=3.6-2.1) percentage points of improvement in attendance is the estimate of intervention impact for providing biscuits to school children. This means 1.5 percentage points increase in attendance occurred due to

biscuit intervention. Similarly, a 0.4 percentage points of decrease in school attendance due to providing meals to school children can be claimed here. This tiny difference means no such impact is found for meal intervention. However, the impact appears positive for meal schools in the context of boys only.

Impact Based On Headcount

It is obvious from Table 3 that when attendance is calculated based on head-counts during school visits the average attendance for the comparison schools is substantially lower than that of both the intervention groups. The estimated average attendance is 63 percent for the comparison schools. The average attendance for the biscuit schools is 74 percent and the corresponding figure is 69 percent for the meal schools.

Table 3: Attendance (%) based on head-counts

	Comparison			Biscuit			Meal		
	Girls	Boys	All	Girls	Boys	All	Girls	Boys	All
Registry 2016-17	88	86	87	89	86	88	88	86	87
Registry 2012-13	85	85	85	85	83	84	87	84	85
Difference	2.6**	1.3	2.1*	4.2***	2.9***	3.6***	1.1	2.3**	1.7*

Clearly, average attendance for girls is higher than that of boys for all the three groups even though the difference is relatively small for the comparison group. Since we have selected our samples from comparable areas with similar characteristics (as much similar as possible) we can attribute the attendance difference between comparison and the intervention groups to program impacts. Thus, we obtain an 11 percentage point increase of attendance for providing biscuits to school children[2]. The impacts are 13 (=77-64) percent for girls and 8 (=70-62) percent for boys under biscuit schools. Similarly, a 6 percentage point increase in school attendance due to providing meals to school children without much difference between girls and boys.

These impacts are based on the assumption that the schools are similar across the groups before and after intervention. We do not hold information on pre-intervention situation. Since many characteristics are time invariant, we can compare characteristics at present to explore if the groups are similar. Even then the assumption may not display the reality of substantial differences across the groups.

Why do we Observe such Discrepancy?

The first question to ask is if there is any distortion in school records of attendances. The answer is probably yes. On an average, a 15.1 percentage points lower attendances in 468 schools and 17.6 percentage points lower attendances in 150 schools due to headcounts cannot be explained with a lower than normal presence during headcount or the class visits. The survey spanned more than 1 month during April-May, 2017. Attendance data were collected on 585 (= 435+150) schools in two different interventions. The total number of data points is 2925 (= 585 x 5) class visits. This is a huge number to represent the universe of classes in a year. Obviously, headcounts in certain period is not likely to account for the presence of any

2. *** indicates statistical significance at the 1% level, ** indicates statistical significance at the 5% level and *indicates statistical significance at the 10% level.

seasonality embedded in it. Here the information collection on attendance using school registry and headcounts is done at the same time. Since seasonality is likely to affect both methods of attendances similarly, it may be ignored in both cases if there exists any. Therefore, the divergence of attendances from the two modalities cannot be explained by seasonality.

Still we can see if there exists a strong seasonality by examining school records of different seasons. We collected registry based attendances for April, 2017 and September, 2016 both to capture seasonality. April, 2017 shows 2.0 percentage points more attendance than September, 2016 and the difference is statistically significant at the 1 percent level. This means April is not lean season and the headcounts performed in April, 2017 does not necessarily imply low attendance. The headcount attendances are likely the upper bounds since they have been collected during peak season. Another argument for such upper bound is the fact that schools were informed before visits. In such cases, we often find school authorities' drive to increase the presence of students during such visits.

Statistically, the headcounts in 2985 classes are more than necessary to represent overall attendances. Thus, the school registry attendances are somewhat exaggerated. Overstating of attendance by school authority seems widespread. To show their success school authorities often cook up the figures on attendance. Another likely reason for such exaggeration is maintaining 85 percent attendances for the students receiving government stipends (known as 'upobritti'). Such overstatement on attendance obscures the analysis of impact estimation at the end.

Systematic bias in Attendance Exaggeration

As long as exaggeration or biases remain same across the control and the intervention we can still go with the impact estimate, obviously with lesser precision. One inherent problem is that often such exaggerations shows systematic bias toward one group. If we look into the differences of attendances between headcount and registry, greater differences are observed for control schools. For the control schools, the difference is 18.3 percentage points whereas it is 14.6 percentage points for the intervention schools. Roughly, the difference in exaggeration is 4 percentage points across the groups. The differences are 6.5, 1.0 and 4.7 percentage points for North, Coastal and Dhaka regions, respectively 4. The difference is found roughly 8 percentage points in case of 150 schools.

Table 4: Attendance Rates Over Time Across Regions

		2012	2014	2017	Head count	Difference
Control	North	90.8	89.3	91.8	71.6	**20.2**
	Coastal	89.9	84.8	92.5	80.9	**11.6**
	Dhaka	89.6	89.3	89.7	68.9	**20.9**
Intervention	North	86.4	87.9	87.1	72.4	**14.7**
	Coastal	90.5	92.3	91.3	80.7	**10.6**
	Dhaka	90.2	88.8	89.4	73.2	**16.2**

These differences indicate that exaggeration of registry attendances is relatively more in control schools than the intervention. We see that to happen in our case with the systematic bias toward the control concealing the impacts. Since every school has a target to reach at

least 85 percent of attendances, they have a focal point to achieve. *Likely, control schools exaggerate attendances more than the intervention to achieve this target due to their lower genuine attendances than the intervention.* Thus, even though both the group exaggerate attendances, as argued and as reflected in the gaps of attendances based on headcounts and registry, the differential gaps shows relatively more exaggeration by the control schools. For this not to be true, any one of the following has to happen-

(i) Higher headcount attendances than actual class presence by intervention schools, everything else same

(ii) Lower headcount attendances than actual class presence by control schools, everything else same

(iii) Drives by only intervention schools to increase students' presence during class visits

(iv) Different combinations of (i), (ii) and (iii), relaxing everything else same

Obviously, headcounts are not likely to be systematically biased toward a group since they are counted by survey enumerators, not by the school authorities. It is also not practical to think of drives by only intervention schools to increase students' presence during class visits. Thus, none of the four (i-iv) is likely to be true. Relatively greater exaggeration of registry attendances by the control is the possibility because there are fewer countercheeks for them. Also without any additional incentive it may be difficult for them to attract some students in class. For intervention schools, be it biscuit or meal, there is a third agency to match class presence with the packets of biscuits distributed or the number of meals cooked. This places pressure on them not to exaggerate much.

The bottom line is; it is absurd to think of a situation for the control where registry attendances are relatively very high but the headcount attendances are relatively very low. Thus, even though the control is below the intervention, at the end they both end up close to the same number due to relatively more exaggeration by the control. This systematic bias toward the control conceals impacts. Thus, no distortion in headcounts is more practical and assessing impact based on headcounts seems more convincing. One limitation with headcounts is that they are available for April, 2017 only. Therefore, application of difference-in-difference estimation is not possible here. But we can apply cross-sectional variation across groups to estimate impacts. These estimates are acceptable as long as we control for other factors affecting attendance beyond interventions.

Estimating Impacts Based on Headcounts

Now the question is how to estimate impact of intervention on the attendances despite the exaggeration just stated. The likely answer is to focus on the differential of headcount attendances across the groups. Thus, *the impact is 1.9 percentage points of higher attendance due to the intervention*. However, we need to net out part of the differentials due to differences in other factors in the groups. To net out other influences across the groups and to obtain better estimates of impact we need to run a multivariate analysis. As part of multivariable analysis, attendance (based on head-count) is regressed on a set of variables expected to exert influence on attendances. Table 5 presents the results of OLS regression of headcount attendances on a list of variables.

Table 5: Overall Attendance (Head-Count) Of A School - 468 Schools

Variables	Estimated coefficient	Standard error	*t*-ratios	*p*-values
Biscuit_dummy	2.066	1.52	1.360	0.18
student teacher ratio	-0.025	0.05	-0.520	0.60
North	-7.236	1.76	-4.110	0.00
Dhaka	-7.397	1.88	-3.940	0.00
Electricity	1.618	1.62	1.000	0.32
Safe water	-0.781	2.28	-0.340	0.73
# of latrine	-0.048	0.29	-0.160	0.87
Distance to UP HQ	0.013	0.10	0.130	0.90
constant	79.181	3.25	24.380	0.00

The variables are student-teacher ratio, regional dummies, access to electricity and safe drinking water, number of latrines and the distance to upazila headquarters. The variable *student-teacher ratio* is negative but not statistically significant. May be there is little variation across schools in terms of student-teacher ratio making it insignificant. Regional dummies *North* and *Dhaka* are negative and they are statistically significant at the 1 percent level. This means *Coastal* schools perform better compared to their other counterparts. Other variables such as school's access to electricity and safe drinking water, number of latrines and the distance to upazila headquarter show up as not statistically significant. The impact of the intervention is 2.1 percentage points of greater attendance for the feeding schools. Even if we consider registry based attendance and net off 4 percentage points' biases toward the control then similar level of impact on attendance is evident.

Now we perform similar multivariable analysis for second set of intervention which is for 150 schools. The survey on this set of schools collects more information with greater coverage with the purpose of assessing impacts for both biscuit and meal intervention, and thus the list of control variables are more diverse here. The interventions – biscuit and meal- are denoted by the variables *biscuit_dummy* and *meal_dummy*, respectively. Table 6 presents the results of OLS regression of headcount attendances on the explanatory variables.

Table 6: Overall Attendance (Head-Count) Of A School-150 Schools [a]

Variables	Estimated coefficient	Standard error	*t*-ratios	*p*-values[b]	95% confidence interval	
district	-2.85	3.036	-0.94	0.349	-8.86	3.15
distance to						
Local market	-0.87	0.85	-1.02	0.311	-2.55	0.82
Upazila HQ	0.19	0.18	1.06	0.293	-0.17	0.54
UP Office	0.22	0.50	0.43	0.664	-0.77	1.21
Nearest bus stand	-0.36	0.38	-0.95	0.346	-1.12	0.40
Nearest Post office	0.69	0.73	0.94	0.346	-0.76	2.14
Nearest Bank	0.10	0.36	0.28	0.782	-0.62	0.82
# of girls/per latrine	0.36	0.83	0.44	0.660	-1.27	2.00
student teacher ratio	-0.04	0.07	-0.57	0.570	-0.17	0.09
# of students/class room	-0.13	0.08	-1.67	0.097	-0.28	0.02
meal_dummy	**5.72**	2.93	1.95	0.053	-0.08	11.52
biscuit_dummy	**8.46**	3.21	2.64	0.009	2.11	14.81
constant	66.10	4.86	13.59	0.000	56.48	75.72

[a] These results were produced with 150 observations obtaining an F-statistic of 2.54 and an R2 of 0.1647, which corresponds to a p-value less than 0.05. The dependent variable is the attendance of a school.
[b] The *p*-values give probabilities of more extreme *t*-ratios for the hypothesis of a zero coefficient.

District dummy is negative even though statistically not significant. This means Jamalpur schools perform poorly compared with their Barguna counterpart. Distances to local market, UP office, nearest bus stand, nearest post office, and nearest bank show up as statistically not significant. This means proximity to economic activity leaves no significant positive impact on attendances. The variables "*# of girls/per latrine*" and "*student-teacher ratio*" show up as not statistically significant. May there is little variation across schools in terms of variables making them insignificant. However, number of student per class shows negative sign and it is statistically significant at the 10 percent level. It is sensible and expected because bigger class size is expected to lower performance for various reasons.

Here we obtain an impact of 5.7 percent increase in attendance due to meal intervention and an 8.5 percent increase due to biscuit intervention. These are statistically significant at the 10 percent level for biscuit and 1 percent level for meal intervention. Obviously, these impacts are smaller than the mean differences calculated which are 6 percent and 11 percent.

Conclusions

We obtain an impact of 11 percentage point increase of attendance for providing biscuits to school children. The impacts are 13 percent for girls and 8 percent for boys under biscuit schools. Similarly, we obtain a 6 percentage point increase in school attendance due to providing meals to school children, without much difference between girls and boys. These are obtained based on headcounts in classes during the survey. After multivariate adjustments the impacts tone down to 8.5 and 5.7 percentage points increase of attendance for biscuit and meal, respectively. The impacts are 4.0 and 3.6 percent increase of attendance for biscuit and meal, respectively in the context of attendances based on registry.

Based on headcount attendance, we find a 1.9 percentage point of intervention impact on the attendance rate for 468 schools. After multivariate adjustments the impact remains 2.1 percentage points. The impact is highest for the girls which is 2.4 points. If we look into the differences of headcount attendances with registry based attendances for 468 schools (irrespective of control or intervention) then difference are 15.1 points. The difference is statistically significant at the 1 percent level. Registry based attendance seems biased toward the control schools.

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