



## Primary education and its impact on literacy rate: A division wise comparative study of Bangladesh



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### ABSTRACT

*This study investigates the impact of a number of educational institutions and students per teacher on the literacy rate. Data of 489 Upazilas relating to the dependent (literacy rate) and independent variables (no. of educational institutions and students per teacher of different types of primary and equivalent educational institutions) of 8 Divisions were collected from District Statistics 2011 of Bangladesh Bureau of Statistics. The Ordinary Least Square (OLS) method is used in this study. This research found that a number of government primary schools had a significant positive relationship with the literacy rate in Barishal, Chittagong, Khulna, and Mymensingh Divisions.*

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## Introduction

Literacy refers to the ability to read and write at a level by which an individual can efficaciously understand and adapt with written communication in all media (print or electronic), including digital literacy. According to UNESCO, literacy is the ability to apprehend what a person reads and writes in his or her first language and the ability to keep day-to-day accounts regarding household income and expenditure.

However, we are no more in a position to confine literacy only on reading and writing. At present, literacy is so much crucial to economic development as well as individual and community well-being. Effective literacy skill paves the way of more educational and employment opportunities which enable people to pull themselves out of poverty and chronic underemployment. Besides, from an individual perspective, adequate literacy skill enables one's to partake and act happily within – and contribute to – his or her communities.

So, in the context of complex and rapidly-changing technological world, it is essential for us to enlarge our knowledge continuously and acquire new skills in order to keep up with the pace of change. In contrast, nearly 45% people of Bangladesh (Bangladesh Bureau of Statistics, 2011) are unable to read or write, and therefore struggle to earn a living for themselves and their families. An illiterate person is like a blind man who cannot see anything and everything appears to be dark to him. It prevents him or her from marching ahead to seat-up an ideal social fabric. Now, the question rises how far a developing country like Bangladesh can go by holding such an illiteracy rate.

Many studies would have been conducted on the reasons behind this illiteracy rate and the consequences of this moral hazard. As a consequence, poverty, child labor, child marriage and population explosion got much more significance. Burchi (2006) looked at the relationship between education, human growth, and food security across countries. He discovered that increasing younger children's

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attendance at school by 100 percent would decrease food poverty by 22 percent, but this association was only observed for basic education, not higher education.

This study attempts to show the effect of number of educational institutions on literacy rate. Moreover, it explores the relationship between students per teacher and literacy rate. To accomplish the objective, we have used Ordinary Least Square (OLS) method on the Data of 489 Upazilas of 8 Divisions of Bangladesh.

As previous studies concentrated on mainly identifying the reasons and showing the consequences of poor literacy rate of Bangladesh, our study will certainly benefit policy makers along with adding valuable insights to existing literature.

The remaining part of the paper is organized as follows. Section two reviews prior literature related to impact of educational institutions and students per teacher on literacy rate. Section three elaborates detailed research methodology by describing data collection, empirical model of this study. Section four presents findings and discussion, section five present recommendations and implications, section six discusses the limitations of the study and section seven concludes the paper.

## **Literature Review**

Literacy, according to Aistear (NCCA, 2009, p.56), is more than the ability to read and write. It's about assisting children in communicating with others and making sense of their surroundings. Oral and written languages, as well as other sign systems like arithmetic, painting, voice, images, Braille, sign language and music are also included. Literacy also recognizes the nature of information and communication technologies, as well as a variety of other ways of representation that are important to youth, such as screen-based representation (electronic games, computers, the internet, television).

According to Noble Laurites Theodore Schultz and Gary Becker, preparation allows workers to earn higher incomes in the job market. Furthermore, through engaging in human resources by education, labour efficiency can be improved. It is often claimed that increased job productivity is a function of a larger stock of intellectual resources, as well as higher market incomes (HDRSA, 1998).

Literacy, according to Essien (2005), is described as the ability to read and write in a language. According to Asiedu and Oyediji (1985), functional literacy is an intellectual tool that enables a person to not only be literate, but also to perform other tasks that support him or her and the society in which he or she resides. According to Asadullah and Chaudhury (2012), a large proportion of students do not acquire basic literacy and numeracy skills after completing primary school. According to the 2008 School Watch Report, students who finished the primary education continuum (grade 5) only obtained 18.7% of the 27 assessed competencies (Nath & Chowdhury, 2009). According to Street (1995), a family's socioeconomic status has more to do with a child's literacy level than literacy levels do with wages. The higher the family income, the more likely the children are to have a high degree of literacy; in other words, while illiteracy does not cause poverty, poverty does cause illiteracy.

Schultz (1988) and Becker (1993) backed up the evidence that investing in human resources by education contributes to higher incomes and higher levels of competitiveness in the industry. The theory was backed by empirical data from Bangladesh, which looked at wage gaps between high school trained women and women without a high school diploma, which were found to be 7 times higher than the wages of women without a high school diploma (World Bank 1993). In Pakistan, it was discovered that a 10% increase in male literacy results in a 2.7 percent increase in farm production, while a 10% increase in some other input results in half the amount of production (Rosegrant and Evenson, 1993). Surprisingly, as opposed to illiterate neighbors, skilled neighbors have a favorable effect on job performance. Foster and Rosenzweig (1995) conducted this kind of research in India. In comparison to illiterate farmers, farmers with no schooling had a 4 percent higher profitability rate if their neighbors had completed primary school education. Human capital investment not only tends to raise incomes and productivity but it also encourages varying rates of return depending on the amount of years spent in educational institutions. According to a World Bank survey from 1994, Nepalese citizens got 100% return on investment for primary education, 29.1% and 15% for lower secondary and secondary education and 2.17 percent for bachelor's education respectively. In the same report, it was also discovered that the rate of return on investment for girls' education was significantly higher than for boys' education. Lind (2008) examines the reasons for and against literacy by stakeholders and claims that "adult literacy has been de facto ignored in real policies and resource distribution." The language divide between official and unofficial languages creates a slew of issues for minority language speakers, including cultural, educational, and socioeconomic disadvantages (Wagner, 2003).

M. Dridi (2014) found a significant correlation between corruption and high school graduation rates but there is a weaker link between corruption and education quality as calculated by repeater rates. According to the findings, high and growing levels of corruption dramatically reduce access to education. Enrollment rates drop by almost 10% with any unit rise in corruption. According to Ehrlich and Lui (1999), the need to profit from rentals generated by government interference in the economy is likely to influence individual decisions to invest in human resources, leading to people spending less time in school and instead focusing on acquiring political capital that allows them to maintain bureaucratic control and participate in rent-seeking practices. Gupta et al. (2002) stated corruption is likely to result in educational disparities. This may occur as wealthier demographic groups' pressure the government to direct social spending toward the provision of educational programs that are more beneficial to their own interests. According to the writers, corruption reduces the constructive effect of social services and encourages the misappropriation of public funds intended for vulnerable citizens, resulting in small poverty reduction initiatives and less money available for extending access and increasing

educational efficiency. Kaufmann, Kraay, and Zoido-Lobaton (1999) wanted to see whether there was a connection between various governance metrics, such as corruption control and growth outcomes, such as educational outcomes. They show that increased anti-corruption measures contribute to higher adult literacy rates in a wide range of countries. Many research [Perotti (1996), Flug et al. (1998), Easterly (2007), Checchi (2003), and Papagapitos and Riley (2009)] have shown that higher income inequality is correlated with lower school attendance and results.

According to the United Nations Development Programme UNDP (1999), rising agricultural production requires a minimum of 4 to 6 years of schooling. Illiteracy is most common in developed countries, according to UNESCO (2005). The importance of foundation skills was recognised in the EFA Global Monitoring Report 2012, which recognized the importance of foundation skills in preparing youth for the world of jobs, developing their work skills and earning a "decent livelihood." The medium for learning foundation skills is both primary and secondary education. Deficits in primary education, as previously stated, are impediments to the advancement of foundation skills. Young people from low-income families have a harder time learning fundamental skills. Environmentally deprived and physically isolated areas of the world fall behind the national average in terms of performance (Ahmed et.al. 2013).

Nearly two-thirds of children who never attend primary school come from households who are "always in deficit" in staple grains (extremely poor) and "occasionally in deficit" during the year (poor). Despite the fact that just 45 percent of the population falls into this group, 55% of children who drop out come from "food deficit" households. Food insecurity, a metaphor for general poverty, has a significant negative impact on enrolment and school retention (Hossain and Zeitlyn 2011).

## Research and Methodology

To achieve the objectives of the study, data were extracted from Bangladesh Bureau of Statistics (*BBS, District Statistics 2011*). Different independent variables (i.e. number and students per teacher of government primary school, Registered primary school, private (non-registered) primary school, kindergarten school (pre schooling), NGO school, ebte dayee madrasah and a dependent variable (literacy rate) were selected from all 489 Upazilas (including city corporations and Dhaka metropolitan) of 8 divisions of Bangladesh. Due to the type and trends of available data, Semi log econometric model was employed to achieve the best results of the study. In this regard, SPSS was utilized for data analysis purposes. Several regressions were run but following best econometric model was selected to express the results and relationships between variables of interests.

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \mu$$

Where,

y = literacy rate all of the 489 upazila of Bangladesh.

X1= Number of government primary school

X2= Number of Registered primary school

X3= Number of private (non-registered) primary school

X4= Number of kindergarten school (pre schooling)

X5= Number of NGO school

X6= Number of ebte dayee madrasah

X7= Students per teacher of government primary school

X8= Students per teacher of Registered primary school

X9= Students per teacher of private (non-registered) primary school

X10= Students per teacher of kindergarten school (pre schooling)

X11= Students per teacher of NGO school

X12= Students per teacher of ebte dayee madrasah

## Findings and Discussion

### Descriptive Analysis

#### Literacy Rate

Table-1 shows different descriptive statistics of literacy rate of 489 Upazilas (including city corporations and metropolitans) in 8 Divisions of Bangladesh. Among the eight divisions, Barisal Division has the highest average literacy rate and Mymensingh Division has the lowest average literacy rate. In Barisal Division, ManpuraUpazila of Bhola District had the lowest literacy rate and PirojpurSadarUpazila of Pirojpur District had the highest literacy rate in 2011. In Chittagong Division, TeknafUpazila of Cox's Bazar District had the lowest literacy rate and Chittagong City Corporation had the highest literacy rate in 2011. In Dhaka Division (excluded the Upazilas included in Mymensingh Division), Itna Upazila of Kishoreganj District had the lowest literacy rate and Dhaka Metropolitan had the highest literacy rate in 2011. In Khulna Division, Daulatpur Upazila of Kushtia District had the lowest literacy rate and Khulna City Corporation had the highest literacy rate in 2011. In Mymensingh Division (Created in 2015), Dhobaura Upazila of Mymensingh District had the lowest literacy rate and Mymensingh Sadar Upazila of Mymensingh District had the highest literacy rate as per data available in 2011. In Rajshahi Division, DhunatUpazila of Bogra District had the lowest literacy rate and

Rajshahi City Corporation had the highest literacy rate in 2011. In Rangpur Division, Fulchhari Upazila of Gaibandha District had the lowest literacy rate and Dinajpur Sadar Upazila of Dinajpur District had the highest literacy rate in 2011. In Sylhet Division, Companiganj Upazila of Sylhet District had the lowest literacy rate and Sylhet City Corporation had the highest literacy rate in 2011.

**Table 1:** Summary of Descriptive Statistics (Literacy Rate)

Division	Observations	Mean	Median	Standard Deviation	Minimum	Maximum
Barisal	41	57.71%	60.90%	10.03%	32.1%	70.3%
Chittagong	101	48.82%	51.00%	10.17%	26.7%	68.8%
Dhaka	89	49.69%	50.80%	8.58%	27.7%	74.6%
Khulna	60	53.39%	52.90%	6.35%	41.3%	72.7%
Mymensingh	34	39.31%	38.95%	5.74%	29.4%	51.7%
Rajshahi	67	47.71%	47.20%	6.92%	35.6%	71.9%
Rangpur	58	46.47%	46.00%	6.20%	31.2%	64.3%
Sylhet	39	42.90%	40.80%	9.62%	26.5%	63.9%

### Primary and Equivalent Institutions

Table-2 shows different descriptive statistics of primary and equivalent institutions of 489 Upazilas (including city corporations and metropolitans) in 8 Divisions of Bangladesh. Among the eight divisions, Mymensingh Division has the highest average primary and equivalent institutions and Barisal Division has the lowest average primary and equivalent institutions. In Barisal Division, there were 8,267 primary and equivalent institutions, Bamna Upazila of Barguna District had the lowest number of primary and equivalent institutions and Char Fasson Upazila of Bhola District had the highest number of primary and equivalent institutions in 2011. In Chittagong Division, there were 22,788 primary and equivalent institutions, Laxshmichhari Upazila of Khagrachori District had the lowest number of primary and equivalent institutions and Chittagong City Corporation had the highest number of primary and equivalent institutions in 2011. In Dhaka Division (excluded the Upazilas included in Mymensingh Division), there were 24,405 primary and equivalent institutions, Charbhadrashon Upazila of Faridpur District had the lowest number of primary and equivalent institutions and Dhaka Metropolitan had the highest number of primary and equivalent institutions in 2011. In Khulna Division, there were 12,151 primary and equivalent institutions, Debhata Upazila of Satkhira District had the lowest number of primary and equivalent institutions and Manirampur Upazila of Jessore District had the highest number of primary and equivalent institutions in 2011. In Mymensingh Division (Created in 2015), there were 12,151 primary and equivalent institutions, Khaliajuri Upazila of Netrokona District had the lowest number of primary and equivalent institutions and Ishwargonj Upazila of Mymensingh District had the highest number of primary and equivalent institutions as per data available in 2011. In Rajshahi Division, there were 14,911 primary and equivalent institutions, Bholahat Upazila of Chapai Nawabganj District had the lowest number of primary and equivalent institutions and Ullahpara Upazila of Sirajganj District had the highest number of primary and equivalent institutions in 2011. In Rangpur Division, there were 17,184 primary and equivalent institutions, Char Rajibpur Upazila of Kurigram District had the lowest number of primary and equivalent institutions and Patgram Upazila of Lalmonirhat District had the highest number of primary and equivalent institutions in 2011. In Sylhet Division, there were 9,979 primary and equivalent institutions, Azmirigonj Upazila of Habiganj District had the lowest number of primary and equivalent institutions and Kamalganj Upazila of Moulvibazar District had the highest number of primary and equivalent institutions in 2011.

**Table 2:** Descriptive Statistics (Primary and Equivalent Institutions)

Division	Observations	Mean	Median	Standard Deviation	Minimum	Maximum	Sum
Barisal	41	201.6341	175	97.46403339	67	617	8267
Chittagong	101	225.6238	214	128.3745186	59	1024	22788
Dhaka	89	274.2135	180	604.6538542	46	5781	24405
Khulna	60	202.5167	193.5	88.11442708	74	418	12151
Mymensingh	34	301.6176	272	125.5547725	114	659	10255
Rajshahi	67	222.5522	187	114.8084417	80	863	14911
Rangpur	58	296.2759	295.5	131.9366	76	626	18764
Sylhet	39	255.8718	226	121.1982238	63	591	9979

### Students per Teacher in Primary and Equivalent Institutions

Table-3 shows different descriptive statistics of students per teacher in primary and equivalent institutions of 489 Upazilas (including city corporations and metropolitans) in 8 Divisions of Bangladesh. Among the eight divisions, Mymensingh Division has the highest average students per teacher in primary and equivalent institutions and Khulna Division has the lowest average students per teacher

in primary and equivalent institutions. In Barisal Division, Dumki Upazila of Patuakhali District had the lowest average students per teacher in primary and equivalent institutions and Hizla Upazila of Barisal District had the highest students per teacher in primary and equivalent institutions in 2011. In Chittagong Division, Ruma Upazila of Bandarban District had the lowest average students per teacher in primary and equivalent institutions and Teknaf Upazila of Cox's Bazar District had the highest average students per teacher in primary and equivalent institutions in 2011. In Dhaka Division (excluded the Upazilas included in Mymensingh Division), Kashiani Upazila of Gopalganj District had the lowest average students per teacher in primary and equivalent institutions and Gopalpur Upazila of Tangail District had the highest average students per teacher in primary and equivalent institutions in 2011. In Khulna Division, Sarankhola Upazila of Bagerhat District had the lowest average students per teacher in primary and equivalent institutions and Sharsha Upazila of Jessore District had the highest average students per teacher in primary and equivalent institutions in 2011. In Mymensingh Division (Created in 2015), Madarganj Upazila of Jamalpur District had the lowest average students per teacher in primary and equivalent institutions and Jamalpur Sadar Upazila of Jamalpur District had the highest average students per teacher in primary and equivalent institutions as per data available in 2011. In Rajshahi Division, Lalpur Upazila of Natore District had the lowest average students per teacher in primary and equivalent institutions and Dhamoirhat Upazila of Naogaon District had the highest average students per teacher in primary and equivalent institutions in 2011. In Rangpur Division, Bochaganj Upazila of Dinajpur District had the lowest average students per teacher in primary and equivalent institutions and Sundarganj Upazila of Gaibandha District had the highest average students per teacher in primary and equivalent institutions in 2011. In Sylhet Division, Jaintiapu Upazila of Sylhet District had the lowest average students per teacher in primary and equivalent institutions and Baniachang Upazila of Habiganj District had the highest average students per teacher in primary and equivalent institutions in 2011.

**Table 3:** Descriptive Statistics (Students per Teacher in Primary and Equivalent Institutions)

Division	Observations	Mean	Median	Standard Deviation	Minimum	Maximum
Barisal	41	35.27	33.83	14.06	15.33	91.33
Chittagong	101	41.97	39.00	19.03	9.50	110.83
Dhaka	89	39.10	36.00	13.15	13.17	118.00
Khulna	60	35.19	34.17	7.77	20.67	52.83
Mymensingh	34	42.57	42.25	6.63	31.50	59.50
Rajshahi	67	36.97	34.50	8.57	22.17	72.33
Rangpur	58	36.72	36.00	9.30	14.83	75.00
Sylhet	39	38.98	38.17	8.78	19.17	57.67

### An analysis of literacy rate, primary and equivalents institutions, students per teacher of those institutions

#### Barishal Division

From the study of 41 Upazilas in Barisal Division, it is found that there is a positive relationship between literacy rate and number of government primary schools, kindergarten schools and ebte dayee madrasah. There is a negative relationship between literacy rate and number of registered primary schools, private primary schools and NGO schools. In case of students per teacher, there are negative relationships between literacy rate and students per teacher of all types of primary institutions except private primary schools.

Table 4 exposes the regression estimation of literacy rate and the dependent variables (number of primary and equivalent educational institutions and the students per teacher of those institutions). Here R square and adjusted R square are 0.781531 and 0.687902 respectively. The high value of R square indicates that 78% the variance of estimator (number and students per teacher of government primary school, registered primary school, private primary school, kindergarten school, NGO school and ebte dayee madrasah) succeeds to explain the variance of literacy rate.

As the *p* value of F (Table 5) is significant (0.0000), we can write down the regression estimation in the following way, using the coefficient in Table 6:

$$\text{Literacy rate} = 70.12994 + 0.12658 \text{ nGPS} - 0.16345 \text{ nRPS} - 0.08003 \text{ nPPS} + 0.26317 \text{ nKGS} - 0.05978 \text{ nNGOS} + 0.04130 \text{ nEM} - 0.14356 \text{ sptGPS} - 0.08757 \text{ sptRPS} + 0.02661 \text{ sptPPS} - 0.04476 \text{ sptKGS} - 0.06663 \text{ sptNGOS} - 0.03798 \text{ sptEM}$$

**Table 4:** Regression Statistics (Barisal Division)

Regression Statistics	
<b>Multiple R</b>	0.884042
<b>R Square</b>	0.781531
<b>Adjusted R Square</b>	0.687902
<b>Standard Error</b>	5.603996
<b>Observations</b>	41

**Table 5:** ANOVA (Barisal Division)

ANOVA					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
<b>Regression</b>	12	3145.65	262.1375	8.347059	0.0000021
<b>Residual</b>	28	879.3337	31.40477		
<b>Total</b>	40	4024.984			

**Table 6:** Coefficients (Barisal Division)

Coefficients						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
<b>Intercept</b>	70.12994	3.88780	18.03846	0.00000	62.16614	78.09373
<b>nGPS</b>	0.12658	0.04253	2.97617	0.00596	0.03946	0.21370
<b>nRPS</b>	-0.16345	0.05398	-3.02777	0.00524	-0.27403	-0.05287
<b>nPPS</b>	-0.08003	0.26800	-0.29860	0.76745	-0.62901	0.46896
<b>nKGS</b>	0.26317	0.12725	2.06808	0.04798	0.00250	0.52383
<b>nNGOS</b>	-0.05978	0.02041	-2.92978	0.00668	-0.10158	-0.01798
<b>nEM</b>	0.04130	0.04425	0.93331	0.35864	-0.04935	0.13195
<b>sptGPS</b>	-0.14356	0.08307	-1.72807	0.09499	-0.31373	0.02661
<b>sptRPS</b>	-0.08757	0.06859	-1.27659	0.21223	-0.22807	0.05294
<b>sptPPS</b>	0.02661	0.05360	0.49649	0.62342	-0.08319	0.13642
<b>sptKGS</b>	-0.04476	0.13213	-0.33877	0.73731	-0.31541	0.22589
<b>sptNGOS</b>	-0.06663	0.03921	-1.69941	0.10033	-0.14694	0.01368
<b>sptEM</b>	-0.03798	0.04566	-0.83183	0.41254	-0.13151	0.05555

### Chittagong Division

From the study of 101 Upazilas in Chittagong Division, it is found that there is a positive relationship between literacy rate and number of government primary schools, kindergarten schools and ebteyee madrasah and a negative relationship between literacy rate and number of registered primary schools, private primary schools and NGO schools. In case of students per teacher, there are negative relationships between literacy rate and students per teacher of all types of primary institutions except kindergarten schools and ebteyee madrasah.

Table 7 exposes the regression estimation of literacy rate and the dependent variables (number of primary and equivalent educational institutions and the students per teacher of those institutions). Here R square and adjusted R square are 0.4110692 and 0.3307604 respectively. The high value of R square indicates that 41% the variance of estimator (number and students per teacher of government primary school, registered primary school, private primary school, kindergarten school, NGO school and ebteyee madrasah) succeeds to explain the variance of literacy rate.

As the *p* value of F (Table: 8) is significant (0.0000), we can write down the regression estimation in the following way, using the coefficient in Table-5.3:

$$\text{Literacy rate} = 46.89734 + 0.13804 \text{ nGPS} - 0.09311 \text{ nRPS} - 0.02997 \text{ nPPS} + 0.02264 \text{ nKGS} - 0.02081 \text{ nNGOS} + 0.04149 \text{ nEM} - 0.08347 \text{ sptGPS} - 0.01524 \text{ sptRPS} + 0.00485 \text{ sptPPS} + 0.00658 \text{ sptKGS} - 0.00235 \text{ sptNGOS} - 0.00738 \text{ sptEM}$$

**Table 7:** Regression Statistics (Chittagong Division)

Regression Statistics	
Multiple R	0.6411467
R Square	0.4110692
Adjusted R Square	0.3307604
Standard Error	8.3273377
Observations	101

**Table 8:** ANOVA (Chittagong Division)

ANOVA					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	12	4259.3724	354.9477	5.118610	0.0000020
Residual	88	6102.3207	69.344553		
Total	100	10361.693			

**Table 9:** Coefficients (Chittagong Division)

Coefficients						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	46.89734	3.07116	15.27026	0.00000	40.79406	53.00062
nGPS	0.13804	0.02860	4.82591	0.00001	0.08119	0.19488
nRPS	-0.09311	0.05805	-1.60402	0.11229	-0.20846	0.02225
nPPS	-0.02997	0.09044	-0.33139	0.74114	-0.20971	0.14977
nKGS	0.02264	0.01575	1.43714	0.15422	-0.00867	0.05395
nNGOS	-0.02081	0.01178	-1.76740	0.08063	-0.04422	0.00259
nEM	0.04149	0.02834	1.46385	0.14680	-0.01483	0.09781
sptGPS	-0.08347	0.05422	-1.53941	0.12729	-0.19123	0.02428
sptRPS	-0.01524	0.04810	-0.31682	0.75213	-0.11082	0.08034
sptPPS	-0.00485	0.02269	-0.21358	0.83137	-0.04993	0.04024
sptKGS	0.00658	0.02816	0.23356	0.81587	-0.04939	0.06254
sptNGOS	-0.00235	0.02040	-0.11509	0.90864	-0.04290	0.03820
sptEM	0.00738	0.03097	0.23828	0.81222	-0.05417	0.06893

**Dhaka Division**

From the study of 89 Upazilas in Dhaka Division, it is found that there is a positive relationship between literacy rate and number of government primary schools, registered primary schools and kindergarten schools and a negative relationship between literacy rate and number of private primary schools, NGO schools and ebteyee madrasah. In case of students per teacher, there are negative relationships between literacy rate and students per teacher of all types of primary institutions.

Table 10 exposes the regression estimation of literacy rate and the dependent variables (number of primary and equivalent educational institutions and the students per teacher of those institutions). Here R square and adjusted R square are 0.4582627 and 0.3727252 respectively. The high value of R square indicates that 45% the variance of estimator (number and students per teacher of government

primary school, registered primary school, private primary school, kindergarten school, NGO school and ebte dayee madrasah) succeeds to explain the variance of literacy rate.

As the *p* value of F (Table 11) is significant (0.0000), we can write down the regression estimation in the following way, using the coefficient in Table 12:

$$\text{Literacy rate} = 62.10336 + 0.03328 \text{ nGPS} - 0.52590 \text{ nRPS} - 0.02604 \text{ nPPS} + 0.02748 \text{ nKGS} - 0.51060 \text{ nNGOS} - 0.00642 \text{ nEM} - 0.05421 \text{ sptGPS} - 0.09381 \text{ sptRPS} - 0.16681 \text{ sptPPS} - 0.06212 \text{ sptKGS} - 0.05456 \text{ sptNGOS} - 0.00507 \text{ sptEM}$$

**Table 10: Regression Statistics (Dhaka Division)**

Regression Statistics	
Multiple R	0.676951
R Square	0.4582627
Adjusted R Square	0.3727252
Standard Error	6.7997991
Observations	89

**Table 11 - ANOVA (Dhaka Division)**

ANOVA					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	12	2972.5658	247.71382	5.357449	0.0000017
Residual	76	3514.0324	46.237268		
Total	88	6486.5982			

**Table 12: Coefficients (Dhaka Division)**

Coefficients						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	62.10336	4.25598	14.59201	0.00000	53.62684	70.57989
nGPS	0.03328	0.02823	1.17891	0.24211	-0.02294	0.08950
nRPS	0.52590	0.41491	1.26749	0.20885	-0.30047	1.35227
nPPS	-0.02604	0.01348	-1.93120	0.05719	-0.05289	0.00082
nKGS	0.02748	0.01172	2.34491	0.02164	0.00414	0.05083
nNGOS	-0.51060	0.41248	-1.23788	0.21957	-1.33211	0.31092
nEM	-0.00642	0.09795	-0.06556	0.94790	-0.20150	0.18865
sptGPS	-0.05421	0.03837	-1.41312	0.16170	-0.13063	0.02220
sptRPS	-0.09381	0.07700	-1.21831	0.22688	-0.24716	0.05955
sptPPS	-0.16681	0.05451	-3.06042	0.00305	-0.27536	-0.05825
sptKGS	-0.06212	0.04951	-1.25460	0.21347	-0.16073	0.03649
sptNGOS	-0.05456	0.07663	-0.71198	0.47866	-0.20717	0.09806
sptEM	-0.00507	0.01420	-0.35693	0.72213	-0.03334	0.02321

### Khulna Division

From the study of 60 Upazilas in Khulna Division, it is found that there is a positive relationship between literacy rate and number of government primary schools, private primary schools and kindergarten schools and a negative relationship between literacy rate and number of registered primary schools, NGO schools and ebte dayee madrasah. In case of students per teacher, there are negative relationships between literacy rate and students per teacher of all types of primary institutions except kindergarten schools. Table 13



exposes the regression estimation of literacy rate and the dependent variables (number of primary and equivalent educational institutions and the students per teacher of those institutions). Here R square and adjusted R square are 0.3633466 and 0.2007968 respectively. The high value of R square indicates that 36% the variance of estimator (number and students per teacher of government primary school, registered primary school, private primary school, kindergarten school, NGO school and ebtedayee madrasah) succeeds to explain the variance of literacy rate.

As the *p* value of F (Table 14) is significant (0.0249432), we can write down the regression estimation in the following way, using the coefficient in Table 15:

$$\text{Literacy rate} = 58.19365 + 0.13568nGPS - 0.08432nRPS - 0.00463nPPS + 0.06191nKGS - 0.06033nNGOS - 0.03920nEM - 0.05656sptGPS - 0.09091sptRPS - 0.07710sptPPS - 0.14301sptKGS - 0.01615sptNGOS - 0.03852sptEM$$

**Table 13:** Regression Statistics (Khulna Division)

Regression Statistics	
Multiple R	0.6027824
R Square	0.3633466
Adjusted R Square	0.2007968
Standard Error	5.6848318
Observations	60

**Table 14:** ANOVA (Khulna Division)

ANOVA					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	12	866.86445	72.238704	2.235294	0.0249432
Residual	47	1518.9137	32.317313		
Total	59	2385.7782			

**Table 15:** Coefficients (Khulna Division)

Coefficients						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	58.19365	5.88583	9.88708	0.00000	46.35289	70.03441
nGPS	0.13568	0.04613	2.94093	0.00506	0.04287	0.22849
nRPS	-0.08432	0.03566	-2.36432	0.02225	-0.15607	-0.01257
nPPS	0.00463	0.12329	0.03758	0.97018	-0.24339	0.25266
nKGS	0.06191	0.05450	1.13592	0.26175	-0.04773	0.17155
nNGOS	-0.06033	0.02428	-2.48495	0.01657	-0.10918	-0.01149
nEM	-0.03920	0.05605	-0.69944	0.48773	-0.15196	0.07356
sptGPS	-0.05656	0.06104	-0.92653	0.35890	-0.17935	0.06624
sptRPS	-0.09091	0.04441	-2.04694	0.04628	-0.18025	-0.00156
sptPPS	-0.07710	0.03659	-2.10704	0.04048	-0.15070	-0.00349
sptKGS	0.14301	0.10832	1.32033	0.19312	-0.07489	0.36091
sptNGOS	-0.01615	0.08015	-0.20155	0.84114	-0.17739	0.14508
sptEM	-0.03852	0.04793	-0.80366	0.42564	-0.13496	0.05791

**Mymensingh Division**

From the study of 34 Upazilas in Mymensingh Division, it is found that there is a positive relationship between literacy rate and number of government primary schools and kindergarten schools and a negative relationship between literacy rate and number of registered primary schools, private primary schools, NGO schools and ebtedayee madrasah. In case of students per teacher, there are negative relationships between literacy rate and students per teacher of all types of primary institutions except kindergarten schools, NGO schools and ebtedayee madrasah. Table 16 exposes the regression estimation of literacy rate and the dependent variables (number of primary and equivalent educational institutions and the students per teacher of those institutions). Here R square and adjusted R square are 0.463859 and 0.1574927 respectively. The high value of R square indicates that 46% the variance of estimator (number and students per teacher of government primary school, registered primary school, private primary school, kindergarten school, NGO school and ebtedayee madrasah) succeeds to explain the variance of literacy rate.

As the *p* value of F (Table: 17) is significant (0.0000), we can write down the regression estimation in the following way, using the coefficient in Table 18:

$$\text{Literacy rate} = 35.53512 + 0.11286 \text{ nGPS} - 0.01220 \text{ nRPS} - 0.08179 \text{ nPPS} + 0.00380 \text{ nKGS} - 0.00946 \text{ nNGOS} - 0.00182 \text{ nEM} - 0.06099 \text{ sptGPS} - 0.00503 \text{ sptRPS} - 0.01087 \text{ sptPPS} + 0.00923 \text{ sptKGS} + 0.02587 \text{ sptNGOS} + 0.00249 \text{ sptEM}$$

**Table 16:** Regression Statistics (Mymensingh Division)

Regression Statistics	
Multiple R	0.6810719
R Square	0.463859
Adjusted R Square	0.1574927
Standard Error	5.2694628
Observations	34

**Table 17:** ANOVA (Mymensingh Division)

ANOVA					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	12	504.4974	42.04145	1.514067	0.1956350
Residual	21	583.11201	27.767239		
Total	33	1087.6094			

**Table 18:** Coefficients (Mymensingh Division)

Coefficients						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	35.53512	8.40080	4.22997	0.00037	18.06469	53.00554
nGPS	0.11286	0.03696	3.05401	0.00603	0.03601	0.18972
nRPS	-0.01220	0.05046	-0.24170	0.81136	-0.11712	0.09273
nPPS	-0.08179	0.16206	-0.50468	0.61904	-0.41881	0.25523
nKGS	0.00380	0.03818	0.09944	0.92173	-0.07561	0.08320
nNGOS	-0.00946	0.01150	-0.82281	0.41986	-0.03338	0.01445
nEM	-0.00182	0.07750	-0.02352	0.98146	-0.16299	0.15934
sptGPS	-0.06099	0.10436	-0.58443	0.56515	-0.27802	0.15604
sptRPS	-0.00503	0.08019	-0.06277	0.95054	-0.17180	0.16174
sptPPS	-0.01087	0.05648	-0.19238	0.84929	-0.12832	0.10659
sptKGS	0.00923	0.06687	0.13808	0.89149	-0.12982	0.14829
sptNGOS	0.02587	0.15808	0.16367	0.87155	-0.30286	0.35461
sptEM	0.00249	0.05640	0.04412	0.96522	-0.11479	0.11977

### Rajshahi Division

From the study of 67 Upazilas in Khulna Division, it is found that there is a positive relationship between literacy rate and number of government primary schools, private primary schools and kindergarten schools, NGO schools and ebteyee madrasah and a negative relationship between literacy rate and number of registered primary school. In case of students per teacher, there are negative relationships between literacy rate and students per teacher of all types of primary institutions except government primary schools, kindergarten schools and NGO schools. Table 19 exposes the regression estimation of literacy rate and the dependent variables (number of primary and equivalent educational institutions and the students per teacher of those institutions). Here R square and adjusted R square are 0.4847349 and 0.3702316 respectively. The high value of R square indicates that 48% the variance of estimator (number and students per teacher of government primary school, registered primary school, private primary school, kindergarten school, NGO school and ebteyee madrasah) succeeds to explain the variance of literacy rate.

As the *p* value of F (Table: 20) is significant (0.0000), we can write down the regression estimation in the following way, using the coefficient in Table-21:

$$\text{Literacy rate} = 49.07967 + 0.03871nGPS - 0.19379nRPS + 0.15289nPPS + 0.09281nKGS + 0.01173nNGOS + 0.00059nEM + 0.03059sptGPS - 0.03887sptRPS - 0.01064sptPPS + 0.03632sptKGS + 0.07760sptNGOS - 0.00925sptEM$$

**Table 19:** Regression Statistics (Rajshahi Division)

Regression Statistics	
Multiple R	0.6962291
R Square	0.4847349
Adjusted R Square	0.3702316
Standard Error	5.4934081
Observations	67

**Table 20:** ANOVA (Rajshahi Division)

ANOVA					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	12	1533.0317	127.75264	4.233369	0.0001104
Residual	54	1629.5868	30.177533		
Total	66	3162.6185			

**Table 21:** Coefficients (Rajshahi Division)

Coefficients						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	49.07967	4.61645	10.63148	0.00000	39.82425	58.33509
nGPS	0.03871	0.03984	0.97164	0.33556	-0.04117	0.11860
nRPS	-0.19379	0.03826	-5.06490	0.00001	-0.27050	-0.11708
nPPS	0.15289	0.16265	0.94000	0.35140	-0.17320	0.47898
nKGS	0.09281	0.03624	2.56077	0.01327	0.02015	0.16548
nNGOS	0.01173	0.01341	0.87466	0.38563	-0.01515	0.03861
nEM	0.00059	0.05780	0.01018	0.99192	-0.11529	0.11646
sptGPS	0.03059	0.05609	0.54536	0.58775	-0.08187	0.14305
sptRPS	-0.03887	0.06150	-0.63195	0.53009	-0.16218	0.08444
sptPPS	-0.01064	0.04078	-0.26088	0.79518	-0.09239	0.07112
sptKGS	0.03632	0.06599	0.55042	0.58430	-0.09597	0.16861
sptNGOS	0.07760	0.08245	0.94119	0.35080	-0.08770	0.24290
sptEM	-0.00925	0.02227	-0.41526	0.67960	-0.05391	0.03541

**Rangpur Division**

From the study of 58 Upazilas in Khulna Division, it is found that there is a positive relationship between literacy rate and number of government primary schools, private primary schools and kindergarten schools and a negative relationship between literacy rate and number of registered primary schools, NGO schools and ebte dayee madrasah. In case of students per teacher, there are negative relationships between literacy rate and students per teacher of all types of primary institutions except kindergarten schools and ebte dayee madrasah. Table 22 exposes the regression estimation of literacy rate and the dependent variables (number of primary and equivalent educational institutions and the students per teacher of those institutions). Here R square and adjusted R square are 0.6325061 and 0.5345078 respectively. The high value of R square indicates that 63% the variance of estimator (number and students per teacher of government primary school, registered primary school, private primary school, kindergarten school, NGO school and ebte dayee madrasah) succeeds to explain the variance of literacy rate.

As the *p* value of F (Table 23) is significant (0.0000017), we can write down the regression estimation in the following way, using the coefficient in Table 24:

$$\text{Literacy rate} = 59.5866 + 0.0492 nGPS - 0.0436 nRPS + 0.0513 nPPS + 0.1199 nKGS - 0.0146$$

nNGOS- 0.0535 nEM - 0.1149 sptGPS - 0.1677 sptRPS- 0.0650 sptPPS + 0.1060 sptKGS-0.0090 sptNGOS +0.0128 sptEM

**Table 22:** Regression Statistics (Rangpur Division)

Regression Statistics	
Multiple R	0.7953026
R Square	0.6325061
Adjusted R Square	0.5345078
Standard Error	4.2359443
Observations	58

**Table 23:** ANOVA (Rangpur Division)

ANOVA					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	12	1389.7211	115.81009	6.4542524	0.0000017
Residual	45	807.44507	17.943224		
Total	57	2197.1662			

**Table 24:** Coefficients (Rangpur Division)

Coefficients						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	59.5866	3.5752	16.6667	0.0000	52.3858	66.7874
nGPS	0.0492	0.0308	1.5987	0.1169	-0.0128	0.1111
nRPS	-0.0436	0.0272	-1.6031	0.1159	-0.0983	0.0112
nPPS	0.0513	0.0660	0.7785	0.4404	-0.0815	0.1842
nKGS	0.1199	0.0369	3.2529	0.0022	0.0457	0.1942
nNGOS	-0.0146	0.0067	-2.1746	0.0350	-0.0281	-0.0011
nEM	-0.0535	0.0279	-1.9172	0.0616	-0.1097	0.0027
sptGPS	-0.1149	0.0541	-2.1232	0.0393	-0.2239	-0.0059
sptRPS	-0.1677	0.0466	-3.6000	0.0008	-0.2616	-0.0739
sptPPS	-0.0650	0.0330	-1.9697	0.0550	-0.1314	0.0015
sptKGS	0.1060	0.0743	1.4266	0.1606	-0.0437	0.2557
sptNGOS	-0.0090	0.0439	-0.2040	0.8393	-0.0974	0.0795
sptEM	0.0128	0.0181	0.7068	0.4833	-0.0237	0.0493

### Sylhet Division

From the study of 39 Upazilas in Sylhet Division, it is found that there is a positive relationship between literacy rate and number of government primary schools, private primary schools, kindergarten schools and ebteyee madrasah and a negative relationship between literacy rate and number of registered primary schools and NGO schools. In case of students per teacher, there are negative relationships between literacy rate and students per teacher of all types of primary institutions except kindergarten schools and NGO schools. Table 25 exposes the regression estimation of literacy rate and the dependent variables (number of primary and equivalent educational institutions and the students per teacher of those institutions). Here R square and adjusted R square are 0.7238109 and 0.596339 respectively. The high value of R square indicates that 45% the variance of estimator (number and students per teacher of government primary school, registered primary school, private primary school, kindergarten school, NGO school and ebteyee madrasah) succeeds to explain the variance of literacy rate.

As the *p value* of F (Table 26) is significant (0.0001066), we can write down the regression estimation in the following way, using the coefficient in Table-27:

Literacy rate = 45.75624 + 0.01628nGPS – 0.10394nRPS + 0.00199nPPS + 0.25616nKGS – 0.00384nNGOS+0.10677nEM – 0.12130sptGPS – 0.03643sptRPS– 0.02103sptPPS+0.12927sptKGS+0.00591sptNGOS – 0.02070sptEM

**Table 25:** Regression Statistics (Sylhet Division)

Regression Statistics	
Multiple R	0.8507708
R Square	0.7238109
Adjusted R Square	0.596339
Standard Error	6.1131066
Observations	39

**Table 26:** ANOVA (Sylhet Division)

ANOVA					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	12	2546.3371	212.19476	5.678200	0.0001066
Residual	26	971.62188	37.370072		
Total	38	3517.959			

**Table 27:** Coefficients (Sylhet Division)

Coefficients						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	45.75624	6.60232	6.93032	0.00000	32.18497	59.32751
nGPS	0.01628	0.03453	0.47157	0.64116	-0.05469	0.08725
nRPS	-0.10394	0.04736	-2.19469	0.03732	-0.20128	-0.00659
nPPS	0.00199	0.02578	0.07723	0.93903	-0.05100	0.05498
nKGS	0.25616	0.04760	5.38126	0.00001	0.15831	0.35400
nNGOS	-0.00384	0.01309	-0.29365	0.77135	-0.03075	0.02307
nEM	0.10677	0.13580	0.78625	0.43883	-0.17237	0.38592
sptGPS	-0.12130	0.05090	-2.38296	0.02477	-0.22593	-0.01667
sptRPS	-0.03643	0.05280	-0.68986	0.49639	-0.14496	0.07211
sptPPS	-0.02103	0.05234	-0.40179	0.69112	-0.12861	0.08655
sptKGS	0.12927	0.06874	1.88038	0.07130	-0.01204	0.27057
sptNGOS	0.00591	0.07921	0.07462	0.94109	-0.15691	0.16873
sptEM	-0.02070	0.06771	-0.30574	0.76223	-0.15987	0.11847

## Conclusions

Literacy is a blessing while illiteracy is a curse. Illiteracy is the main problem of human society and is deeply rooted in the vicious circle of other basic problems. An illiterate man is unaware and unconscious because he has no knowledge. But we know knowledge is power. It is undeniable that education is the backbone of a nation. But if the majority of the people of a country remains illiterate, the backbone of the nation becomes weaker. It's a matter of great sorrow that one in four people in Bangladesh are unable to read or write whereas the world is set to celebrate International Literacy Day now. We have attempted to demonstrate the impact of number of educational institutions and students per teacher on literacy rate by using Ordinary Least Square (OLS) method on the Data of 489 Upazilas of 8 Divisions of Bangladesh. We found that there is a positive relationship between literacy rate and number of government primary schools, though only Barisal, Chittagong, Khulna and Mymensingh division's data were statistically significant. We also found negative relationship between literacy rate and students per teacher of government primary schools, here Rangpur and Sylhet Division's data were statistically significant.

Future research may benefit from research triangulation i.e. use of multiple methods simultaneously and induction of secondary education in rising literacy rate of Bangladesh. Moreover, exploratory research covering educational systems used in developed countries may help better insights about how to increase literacy rate in developing countries effectively.

We recommend the measures including (i) Undertaking drastic efforts and launching effective programs to encourage the mass people for education can play a vital role in accelerating the literacy rate, (ii) Compulsion of Primary education for all has already been made by the government but at the same time government should also monitor either it is executing properly or not, (iii) Induction of night schooling facilities along with primary school by engaging educated but unemployed young people in teaching can enhance our literacy rate, (iv) Eradication of illiteracy and an increase in literacy can ensure the alleviation of poverty.

Overpopulation, financial and resource constraints, people's superstition, negative attitude to world education, lack of awareness etc. are responsible for illiteracy. So in the struggle of eradicating illiteracy, all of us should come forward to co-operate with the government.

This study has some limitations in its scope of investigation. First, our research is based on a single method. We have used Ordinary Least Square (OLS) method to conduct the study. Second, data of 489 Upazilas of 8 Divisions of Bangladesh used in the study are not up-to-date. Data were extracted from Bangladesh Bureau of Statistics (*BBS, District Statistics 2011*) since no statistics has come yet after that from BBS.

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