

Comparing the Probable Risk of Dropout of a Student of Different Categories of Primary Schools under Different Locations

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ABSTRACT

This study investigated to identify academically at-risk students and compare the possible risk of dropout of a student of different categories of primary schools under different locations applying descriptive statistics and probability theory. Using two-stage cluster sampling technique, data were collected from 1230 5th-grade students of 60 different categories of primary schools in Rangpur Division of Bangladesh. The results indicated that about 37% with 95% confidence interval (0.34, 0.40) of the 5th-grade students were identified as at-risk. The probable risk of dropout of a female student was more than that of a male student in both government primary schools and ebtedayee madrasahs and also in sub-urban and rural primary schools but the result was opposite in private and urban primary schools. And that of a student of rural government primary school was the highest among different categories of primary schools under different locations. The results suggest that the school authority (both teachers and management) should nurture the academically at-risk students identifying their respective risk factors and motivate them along with their parents so that they can continue their school life with better academic performance.

Keywords: Academic performance, dropout, 5th-grade, probability, risk factor

INTRODUCTION

Academically at-risk and school dropouts are closely related major concerning issues for the sustainable development of a society. "School dropout" means an early withdrawal from the school. The student who dropped out from a school was certainly academically at-risk in earlier stage. The meaning of an "at-risk" student is generally defined as the student who is likely to fail at school. Lots of research articles revealed the negative consequences of dropout that created the obstacles to the path of development of the society. Rumberger (2011) mentioned the consequences of dropout of students that negatively affects the individual and the society. The unemployment rate of dropouts was 75 % in 1998 that was higher than that of high school graduates. Though they get a job, the amount of their earning money is less than that of high school graduates. The nation lost the productivity and earned less tax income (U.S. Department of Education, 2000). Dropouts have more possibility to face the physical problems, involvement in criminal activities, and become dependent on welfare and other government organizations than that of high school graduates (Rumberger, 1987). These negative effects of dropouts obviously need to be removed from the society. To meet this, it is urgently required to identify the academically at-risk students meaning that they can dropout any moment at any stage in future and also to estimate the probable risk of school dropout of a primary student so that school personnel can take necessary steps at an early stage for surviving their school life.

Research evidence indicates the various ways of identifying the students being academically at-risk. U.S. Department of Education (1992) identified seven characteristics of students at-risk namely, i) demographic characteristics (sex, race-ethnicity); ii) family and personal characteristics; iii) parental involvement in academic activities; iv) academic history of the student; v) student behavioral factors; vi) teachers' perception about the student; and vii) school characteristics. School failure was measured by three factors: i) math test scores; ii) reading test scores; and iii) dropout status. Student's three basic demographic variables: sex, race-ethnicity, and socioeconomic status were analyzed. This report mentioned: i) male students were more likely to have low basic skills than the female peers but the possibility of dropping out was not more, and ii) controlling gender and

Socio-economic Status (SES), dropout rates of Black and Hispanic students were not statistically different from the dropout rates of white students. Worley (2007) identified the students as at-risk according to race, single-parent status, self-reported free or reduced lunch status and parents owned or rental home status. Moreover, students attending unstable school, living in single-family homes, living with parents who are not high school graduates, and being home alone more than 3 hours a day are also considered at risk (Chesebro, *et al.* 1992).

The government of Bangladesh introduced stipend program in government primary school from July, 2002 covering 50% of the existing students whose parents were not economically solvent. The aim of the program was to increase the number of enrollment and/or to decrease the number of dropout at primary level of education and the target was to bring and retain 100% of the children up to 5th grade of schooling. The introduction of stipend had the immediate positive impacts on the number of enrollment, school attendance, purchase of stationeries, and the reduction of student dropout (Directorate of Primary Education-DPE, Power and Participation Research Centre-PPRC, and UNICEF Bangladesh, 2013). It was observed that although, the number of enrollment increased at entry level, some dropouts also occurred mostly from the students outside the stipend program. Therefore, the government decided to bring 100% students of elementary classes (Grade I to Grade V) under stipend program which started from July, 2016.

It becomes very important to undertake the study on predicting academically at-risk of dropout of a primary student for meeting up the Universal Primary Education (UPE) as well as the sustainable development of the country.

OBJECTIVES

In order to reduce the consequences of school dropout both at personal and national levels, the objectives of the study are set as:

- i. to identify academically at-risk students at primary-level and
- ii. to compare the probable risk of dropout of a student of different categories of primary schools under different locations

MATERIALS AND METHODS

Study location: Rangpur Division, the northern part of Bangladesh, has been considered as the study area.

Research design

Data collection method: The population of this research includes 5th grade students of selected primary schools. Sample survey was conducted for collecting data and for this a two-stage cluster sampling scheme was adopted for selecting the students from different types of primary schools (Govt., Private and Ebtedayee Madrasha). In the first stage; 10 upazilas were selected randomly from the list of all upazilas of 8 districts in Rangpur division and in the second stage; a representative number of schools in different locations (urban, sub-urban and rural) was selected from each selected upazila with probability proportional to size (PPS). Total number of primary schools selected in the sample was 60. Relevant information regarding student's gender and their academically at-risk factors was collected both at student-and school-level. The enumerated total number of 5th graders from 60 different primary schools being present on the surveyed day was 1230, ranging from 6 to 33 students per school.

Data collection instrument: Data had been collected through direct interview of the 5th grade students and a teacher (involving in teaching in 5th grade) from each selected school using pre-tested structured questionnaire designed for both open and close ended questions. Separate questionnaire had been used to collect the data from the Students and the Teachers. The researcher himself and three data collection assistants were involved in collecting data. Sufficient training was provided to the interviewers for collecting data. The interviewers (including the researcher) visited all selected primary schools for collecting data from the students and teachers.

Data analysis technique: Descriptive statistics and probability theory Based on the findings of the literature and education policy of Bangladesh and discussions with people engaged in child education and some senior teachers of primary schools, the characteristics of at-risk students of primary schools in Bangladesh were considered to be

- i. living with any one of his/her father or mother,
- ii. living with others except father or mother,
- iii. remain frequently absent at school, and
- iv. receiving *upobritti* (stipend) as poor

According to above criteria, a student possessing at least one of the four characteristics is identified as an academically at-risk student. The actual number of those students was computed using the set algebra where different sets were obtained from the

distribution of academically at-risk factors and different categories of primary schools and also from the distribution of interactions among the risk factors.

A student who is likely to be dropped out from school at any stage is termed as academically at-risk. The Probability (p) that a randomly selected student will be academically at-risk of school dropout is computed as:

$$p = \frac{\text{No. of students falling in any of the risk factor}}{\text{Total no. of enumerated students}}$$

Similarly, the Marginal, and Joint Probabilities for an academically at-risk student coming from different categories of primary schools under different locations were estimated.

RESULTS AND DISCUSSIONS

Table 1 reveals that according to criteria set 337 students belonged to academically at-risk group as they fall under *upobritti* (stipend) and they all came from the Government Primary School (GPS). 19 students of GPS fall under the risk factor, 'live with father or mother (any one of them)' that was almost triple of Kindergarten (KG) and more than double of *Ebtedayee Madrasha* (EbM). For the risk factor 'live with others except father or mother', 15 at-risk students came from GPS and negligible number of students (only 3) came from other categories of schools. A large number of students (82) from GPS and 11 students from each of other two categories of schools were identified as at-risk students in grade-V considering the risk factor of 'remain frequently absent at school'.

Table 1: Number of academically at-risk students of 5th grade of different primary schools under different risk factors, 2015

School type	Academically at-risk factor				Total
	A =Upobritti for poor student	B = Live with father or mother (any one of them)	C= Live with others except father or mother	D = Remain frequently absent at school	
Govt. primary	337	19	15	82	453
Private primary	0	6	2	11	19
Madrasha	0	7	1	11	19
Total	n(A) = 337	n(B) = 32	n(C) = 18	n(D) = 104	491

It is quite logical that some students may fall under more than one risk factor, addition law for events, therefore, was applied to compute the actual number of academically at-risk students.

The computational procedure is as follows:

Let us define the events:

A = *Upobritti* (stipend), B = Live with father or mother (any one of them),
C = Live with others except father or mother, and D = Remain absent frequently at school.

n(A) = number of students in favor of A,

n(B) = number of students in favor of B and so on for events C and D,

n(A ∩ B) = intersection of events A and B which represents number of students common to both event A and B and so on for other intersections of events, and

n(A ∪ B ∪ C ∪ D) = number of students who met at least one of the above risk factors were considered to be academically at-risk and the others belonged to non at-risk group.

Table 2 summarizes the figures of academically at-risk students involving two or more than two risk factors.

Table 2: Interactions among the academically at-risk factors

Remain frequently absent at school	Avail Upobritt	Live with others except father or mother		Live with father or mother (any one of them)	
		Yes	No	Yes	No
Yes	Yes	0	0	0	21
	No	0	2	2	79
No	Yes	0	4	7	305
	No	0	12	23	775

Using the set algebra, the actual number of academically at-risk student was computed as follows:

From Table 1: $n(A) = 337$, $n(B) = 32$, $n(C) = 18$ and $n(D) = 104$ and

From Table 2:

$n(A \cap B) = 7$, $n(A \cap C) = 4$, $n(A \cap D) = 21$, $n(B \cap C) = 0$, $n(B \cap D) = 2$, $n(C \cap D) = 2$, $n(A \cap B \cap C) = 0$, $n(A \cap B \cap D) = 0$, $n(A \cap C \cap D) = 0$, $n(B \cap C \cap D) = 0$ and $n(A \cap B \cap C \cap D) = 0$.

We know, $n(A \cup B \cup C \cup D) = n(A) + n(B) + n(C) + n(D) - n(A \cap B) - n(A \cap C) - n(A \cap D) - n(B \cap C) - n(B \cap D) - n(C \cap D) + n(A \cap B \cap C) + n(A \cap B \cap D) + n(A \cap C \cap D) + n(B \cap C \cap D) - n(A \cap B \cap C \cap D)$
 $= (337+32+18+104) - (7+4+21+0+2+2) + (0+0+0+0) - 0 = 455$

Therefore, 455 out of 1230 students were found to be academically at-risk and the rest 775 students were found to be not at-risk.

That means $p = \frac{455}{1230} = 0.37$ i.e. 37% of 5th grade students were identified as academically at-risk.

The 95% confidence interval of the probability of a 5th grade primary school student is estimated (David M. Lane, <http://davidmlane.com/hyperstat/B9168.html>) as:

$$p \pm 1.96 \sqrt{\frac{p(1-p)}{n}} \pm \frac{0.5}{n} = (0.34, 0.40)$$

Table 3: Distribution of the students of govt. primary schools, private primary schools, and ebtedayee madrashas according to their sex and academically at-risk factors

	Govt. primary school				Total	Private primary school				Total	Ebtedayee madrasha				Total
Sex	Risk factors					Risk factors					Risk factors				
	A	B	C	D		A	B	C	D		A	B	C	D	
Male (M)	152	8	6	43	209	0	4	1	11	16	0	4	1	4	9
Female (F)	185	11	9	39	244	0	2	1	0	3	0	3	0	7	10
Total	337	19	15	82	453	0	6	2	11	19	0	7	1	11	19

Table 4: Marginal and joint probabilities of male/female and/or academically at-risk factors under different categories of primary schools (Derived from Table 3)

Sex	Govt. primary school				Marg. prob.	Private primary school				Marg. prob.	Ebtedayee madrasha				Marg. prob.
	Risk factors					Risk factors					Risk factors				
	A	B	C	D		A	B	C	D		A	B	C	D	
Male (M)	0.34	0.02	0.01	0.09	0.46	0.00	0.21	0.05	0.58	0.84	0.00	0.21	0.05	0.21	0.47
Female (F)	0.41	0.02	0.02	0.09	0.54	0.00	0.11	0.05	0.00	0.16	0.00	0.16	0.00	0.37	0.53
Marg. prob.	0.75	0.04	0.03	0.18	1.00	0.00	0.32	0.10	0.58	1.00	0.00	0.37	0.05	0.58	1.00

From Table 4, it was found that the probability of a randomly chosen student from govt. primary school and *ebtedayee madrassha* was almost the same (0.54 ~ 0.53) for female at-risk student and that was a little bit more compared to that of a male at-risk student (0.46 ~ 0.47) meaning that a female student may have slightly more chance of becoming dropout than that of a male student in both govt. primary school and *ebtedayee madrassha*. On the other hand, the probability of a randomly chosen student from private primary school female at-risk student (0.16) was much lower than that of male at-risk student (0.84) indicating that in private primary school, a male student may have more risk to become dropout from school compared to that of a female student and this risk was the highest among different types of primary schools. From the joint probabilities, the highest probability that the selected male student of private school will remain frequently absent at school was 0.58.

Table 5: Distribution of the students of urban primary schools, sub-urban primary schools and rural primary schools according to their sex and academically at-risk factors

Sex	Urban primary school				Total	Sub-urban primary school				Total	Rural primary school				Tot al
	Risk factors					Risk factors					Risk factors				
	A	B	C	D		A	B	C	D		A	B	C	D	
Male (M)	0	4	4	20	28	31	5	3	21	60	121	7	1	17	146
Female (F)	0	5	3	15	23	38	6	4	18	66	147	5	3	13	168
Total	0	9	7	35	51	69	11	7	39	126	268	12	4	30	314

Table 6: Marginal and joint probabilities of male/female and/or academically at-risk factors in different locations of primary schools (Derived from Table 5)

	Urban primary school				Marg. prob.	Sub-urban primary school				Marg. prob.	Rural primary school				Marg. prob.
Sex	Risk factors					Risk factors					Risk factors				
	A	B	C	D		A	B	C	D		A	B	C	D	
Male (M)	0.00	0.08	0.08	0.39	0.55	0.25	0.04	0.02	0.17	0.48	0.38	0.02	0.00	0.06	0.46
Female (F)	0.00	0.10	0.06	0.29	0.45	0.30	0.05	0.03	0.14	0.52	0.47	0.02	0.01	0.04	0.54
Marg. prob.	0.00	0.18	0.14	0.68	1.00	0.55	0.09	0.05	0.31	1.00	0.85	0.04	0.01	0.10	1.00

From Table 6, it was observed that the probability of a randomly selected student from either sub-urban or rural primary school was more or less the same (0.52 ~ 0.54) for a female at-risk student and that was more than that of male at-risk student (0.48 ~ 0.46) meaning that a female student may have more possibility to dropout from the school compared to a male student in both sub-urban and rural primary schools. In urban primary school, the probability of becoming an academically at-risk student was more for a male student (0.55) than that of a female student (0.45). That means, in urban primary school, the male student may have a higher risk of becoming dropout from the school compared to that of a female student.

Table 7: Distribution of the students of govt. primary schools, private primary schools and ebtedayee madrasahs according to study locations and risk factors

Study location	Govt. primary school				Total	Private primary school				Total	Ebtedayee madrasha				Total
	Risk factors					Risk factors					Risk factors				
	A	B	C	D		A	B	C	D		A	B	C	D	
Urban (U)	0	5	5	25	35	0	1	1	8	10	0	3	1	3	7
Suburban(S)	69	5	6	30	110	0	5	1	3	9	0	1	0	6	7
Rural (R)	268	9	4	27	308	0	0	0	0	0	0	3	0	2	5
Total	337	19	15	82	453	0	6	2	11	19	0	7	1	11	19

Table 8: Marginal and joint probabilities of study location and/or academically at-risk factors under different categories of primary schools (Derived from Table 7)

	Govt. primary school				Marg. prob.	Private primary school				Marg. prob.	Ebtedayee madrasha				Marg prob.
Study location	Risk factors					Risk factors					Risk factors				
	A	B	C	D		A	B	C	D		A	B	C	D	
Urban (U)	0.00	0.01	0.01	0.06	0.08	0.00	0.05	.05	0.43	0.53	0.00	0.16	0.05	0.16	0.37
Sub-urban(S)	0.15	0.01	0.02	0.06	0.24	0.00	0.26	0.05	0.16	0.47	0.00	0.05	0.00	0.32	0.37
Rural (R)	0.59	0.02	0.01	0.06	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16	0.26
Marg. prob.	0.74	0.04	0.04	0.18	1.00	0.00	0.32	0.10	0.58	1.00	0.00	0.37	0.05	0.58	1.00

It was found from Table 8 that the probability of a randomly chosen student at risk of becoming dropout from govt. primary school was 0.68 for rural area much higher compared to that of sub-urban govt. primary (0.24) and urban govt. primary (0.08) meaning that a rural govt. Primary student may have more possibility to dropout from the school compared to the student of urban and sub-urban govt. primary school. The probability that a randomly chosen student from private primary school will be a student of urban (0.53) is higher in comparison with the student of sub-urban private school (0.47) and rural private school (0.00), due to lack of private school in rural area. It indicates that the student of urban private primary school has more risk of dropout from the school than that of a student of sub-urban private primary school. On the other hand, the probability of a randomly chosen student coming from urban or sub-urban *ebtedayee madrasha* was the same (0.37) and higher than that of a student of rural *madrasha* (0.26) meaning that the probable risk of school withdrawal of a student coming from urban or sub-urban *ebtedayee madrasha* was the same but higher compared to that of the student of rural *madrasha*.

CONCLUSION

- On an average 37% of 5th grade students were identified as academically at-risk that ranged from 34% to 40% with a 95% confidence.
- A female student may have slightly more chance of being an academically at-risk of dropout than that of a male student in both govt. primary schools and *ebtedayee madrashas*. But in private primary schools, this result is found to be reverse. Among different categories of primary schools, a male student coming from private primary school has the highest risk of dropout.
- The possible risk of school dropout of a female student is likely to be higher than that of a male student in both sub-urban and rural primary schools but the opposite result is found in urban primary schools.
- The possible risk of school dropout of a student coming from:
 - rural govt. primary schools is more than that of a student of urban and sub-urban govt. primary schools.
 - urban private primary schools is higher than that of a student of sub-urban (number of private schools is almost nil in rural area).
 - either urban or sub-urban *ebtedayee madrashas* is the same and is higher compare to that of a student of rural *madrashas*.
- ❖ Among different categories of primary schools in different locations, the student belonging to rural govt. primary schools has the highest risk of school dropout.

RECOMMENDATION

The school authority (both teachers and management) should nurture the academically at-risk students identifying their respective risk factors and motivate them along with their parents so that they can continue their school life with better academic performance.

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