



## Impact Analysis of Students' Academic Achievement in High and Low Noise Level Schools Situated on Roadside at Faisalabad

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**Abstract-** Now a day, high populated urban areas faced different problems. One of them is to increase the traffic on main roads of the city. Increase of traffic create high noise level which is disturbed the students' achievement of results in schools situated on such roadside. This study "students' academic achievement in high and low noise level schools situated on roadside at Faisalabad" showed the significant difference in achievement of results of the students in schools situated on high and low noise level roadside. The study was highly significance for teachers to provide the noise free physical environment to the students' and for higher authorities to control the establishment of new schools at the roadsides and noisy areas. The main objectives were to check the noise level of selected secondary schools and then collected the portfolios for achievement of results of these secondary schools' students. Fifteen male and female secondary schools were selected for sample size through simple random sampling. Which of them, eight male and female secondary schools were situated on high noise level and seven male and female secondary schools were situated on low noise level? According to EPA (Environmental Protection Agency) Punjab, the normal noise level was 65 dB (A). High noise level bearing schools had more than 65 dB (A) noise level while low noise level bearing schools below 65 dB (A) noise level. After that, there was selected the sample size of 150 male and female students. Ten students were selected from each of 15 male and female secondary schools and collected the portfolios of these secondary schools' students. There were compared the achievements of results of these students. Descriptive and inferential statistics were used for data collection. Mean, standard deviation and t-test was used to compare the achievements of results. It was found that there was significant difference between the achievements of results of students of high noise level schools and low noise level schools.

**Key words:** EPA (Environmental Protection Agency), dB (A) decibel of A-Weighted, achievements of results, Department of Environment and Population

### I. INTRODUCTION

Now a day, the most important problem faced by schools is noisy busy places such as city, shape and residential area or near to the railway track. Rapid development residential area, surrounding the schools or limited places to build a school is the main cause of this noise pollution. School must be located in a quiet and controlled environment. School activities like study, discussion, learning session are hugely disturbed by this noise population (Gupta 2006).

As the external environmental noise upon children at school affects gradually same like the typical classroom noise effected upon children performance. There are a large number of investigations on external environment as compare to typical classroom noise. Some work is done on such type of noise in previous years. Such type of study shows that noise has bad effect on recognition of word, number and letter (Evans, G.W., 2007).

Student's age at primary level (5-11 years) faced cognitive development problem and indicators attention, retention, memory, reading and recalling are involved in this age. Children receive information through the process of rehearsal organization and elaboration. After receiving the information, they encoded in memory. Sensory, short and long-term memory are work in this manner. Encoding is working for the retrieval of information from memory. So, the environmental noise haves a great effect on all the process of such type of information. Environmental noise affects the performance of cognitive tasks and such type of effect shows in children as well as workers. It has been observed that bad performance in an individual is due to noise, but this would be occurred only an in simple task which is run for short term. On the other hand, in complex tasks it would deteriorate the cognitive performance. Now a day, it is observed that air pollution is a cause of illness. So, it effected on children's health and development. Noise

pollution is a cause of many diseases like stress the hormone, blood pressure, cognitive effect, psychological effect, listening problem etc. all these diseases are seated to health. Children have not much capacity to absorb it so they fall in such health problems which is created by environmental Noise. Noise deficits the performance of an individual by producing impairments and increase in errors when they are working at school situated on the roadside (Shield and Dockrell 2003).

### **Noise Pollution**

Noise pollution may be defined as “unwanted sound which gets dumped into the atmosphere to the annoyance of its recipients” (Gupta, 2006).

### **Sources of Road Noise**

There are many sources of noise. Road noise produced four types of noise which is described in briefly below:

#### **Vehicle noise**

Vehicle's engine system, suspension system, transmission system, exhaust system produced a noise. As the vehicles run on roads so this is a type of road noise. Bad and rough road produced much noise because engine consumption energy increase. Not proper engine maintenance and stop-go vehicle also produced noise.

Urban population is more affected by the vehicle noise which is a transportation noise. This consists of engine and exhaust noise, fluently use of horns especially use of pressure horns, and auto repair workshop (Gupta, 2006).

Urban areas especially in big cities are faced railways and aircrafts noise. The intensity of sound is much high and loud near railway stations and this noise pollution makes high level of noise exposure and becomes a physical irritant to all. In fact, the sound waves travel into the atmosphere and pollute the entire environment, and everyone feels uncomfortable in this environment. The noise level of train is more than 150 dB (Gupta, 2006).

#### **Road noise**

When vehicles run on road then friction produced between the tires and road. As the vehicle run on road at high speed the degree of friction increases and suddenly quick brake increase friction more. Such type of noise called frictional noise.

#### **Driver behaviour**

Driver's behaviour i.e. unnecessary uses of horns, loudly music in vehicles, loudly shouting on each other are also the cause of road noise. Drivers contribute to road noise by causing their tires to squeal as a result of sudden braking or acceleration.

#### **Construction and maintenance**

Now a day's road construction and maintenance used heavy machinery which produced another type of road noise. Such type of activities may be intermittent and localized; they nevertheless contribute tremendous amounts of sustained noise during equipment operation.

### **Noise standards in Pakistan**

In Pakistan, Pakistan Environmental Protection Agency is the government institute which is responsible for establishing Laws, policies, rules and regulations regarding to environmental. For implementation of environmental laws in 4 provinces, Provincial EPAs have been established. Director General is headed the Pakistan EPA and provincial EPAs.

#### **Noise standards for vehicles**

Pakistan Environmental Protection Agency 1997 (PEPA 1997) has been working since 1997 on environmental aspects. Before the 1997 PEPA Act, Pakistan Environmental Protection Ordinance 1983 (PEPO 1983) was promulgated to control the environmental pollution. According to this Act, National Environment Quality Standards for motor vehicle exhaust and noise have been established. Noise level of 65dB (A) is the maximum permissible limit for vehicle noise to be measured at 7.5 meters from the source ([www.environment.gov.pk/PUB-PDF](http://www.environment.gov.pk/PUB-PDF)).

#### **Noise measurement in Lahore City**

In Lahore, the Punjab Environmental Protection Agency has worked to control the environmental pollution. Punjab EPA is responsible to measure the noise level along roadsides. In Lahore, Punjab EPA

measured the average noise level on road was 95 dB (A) which is high noise level as fixed 65dB (A) by PEPA.

([www.pjms.com.pk/issues/janmarch09/article/artile24](http://www.pjms.com.pk/issues/janmarch09/article/artile24)).

#### **Noise measurement in Rawalpindi and Islamabad**

In Pakistan, the Pakistan Environmental Protection Agency (PEPA) Islamabad has worked to control the environmental pollution. Pakistan EPA Islamabad is responsible to measure the noise level along roadsides. In Islamabad and Rawalpindi, Pakistan EPA measured the average noise level on road was 85 dB (A) which is high noise level as fixed 65dB (A) by PEPA.

([www.environment.gov.pk/PUB-PDF](http://www.environment.gov.pk/PUB-PDF)).

#### **Traffic noise pollution in Karachi**

Traffic on roads is the main source to produce the noise pollution in Karachi. In September- December 2010, the traffic noise pollution has been measured in Karachi. The highest noise level of 110 dB (A) was recorded by Sindh EPA at its maximum level. It was observed that the noise level range reached to 100 dB (A) to 110 dB (A) during rush hours along the roadsides. In Karachi city, M.A. Jinnah Road was the highest noise level place of all the area under consideration. It was also observed that the mean values of noise level in commercial and residential areas were 95.75 dB (A) and 60 dB (A) respectively. The noise levels of traffic are significantly higher than all the available international standards ([www.scribd.com](http://www.scribd.com)).

#### **Noise measurement in Faisalabad City**

In Faisalabad, the Punjab Environmental Protection Agency has worked to control the environmental pollution. Punjab EPA is responsible to measure the noise level along roadsides. In Faisalabad, Punjab EPA measured the average noise level on road was 92 dB (A) which is high noise level as fixed 65dB (A) by PEPA.

#### **The effects of noise on attaining the academic targets**

Students are faced different types of noise in school, especially road situated school. Previous studies have shown that schools, which are situated in urban areas, have faced high levels of environmental noise. The sources of noise are road traffic, trains, aircraft, and construction buildings. While inside the schools, there are wide ranges of noise levels have been found, these levels are changing significantly between different modes like different classroom activities and different types of space in classrooms. In different studies it has been observed that young children, in a primary school classroom, are exposed different kinds of noise of other children producing "classroom babble" at levels typically of around 65 dB<sub>A</sub> LAeq in a day, while the overall exposure of noise level of a primary school child has been measured approximately 72 dB<sub>A</sub> LAeq (Celik, E. & Karabiber, Z., 2000).

#### **Noise and Education**

A large number of researches have been conducted about the potential effects of noise on student's educational performance. Some of the studies are laboratory studies which are validated and find that noise at high level is associated and considerable produced reduction in educational performance. Children who are living near airports showed poorer problem-solving abilities as compared to the controls condition and it was also found that children who are living near an airport in Germany were lacking in motivation and less tolerant of frustration compared to controls condition. However, such type of other studies and also these studies have been showed that such high level of noise having restricted samples and may affect performance of children, such type of noise make as a result social disadvantage or being educated in a second language (Gupta, 2006).

#### **Objectives**

The main objectives of the study were to:

1. Check the level of noise of different schools situated on roadside.
2. See the effect of noise on student's academic achievement at road situated schools.

#### **Hypothesis**

Following hypothesis was framed out for this study.

1. There is no significance difference between the achievement of results of students of high noise level schools and low noise level schools.

## **II. METHODOLOGY**

Fifteen male and female secondary schools were selected for sample size through simple random

sampling in Faisalabad city. Which of them, eight male and female secondary schools were situated on roadside at high noise level and seven male and female secondary schools were situated on roadside at low noise level? According to EPA (Environmental Protection Agency) Punjab and NEQS (National environment Quality Standard), the normal noise level was 65 dB(A). High noise level bearing schools had more than 65 dB(A) noise level while low noise level bearing schools below 65 dB(A) noise level. After that, there was selected the sample size of 150 male and female students. Ten students were selected from each of 15 male and female secondary schools and collected the portfolios of these secondary schools' students. Descriptive and inferential statistics were used for data analysing. Mean, standard deviation and t-test was used to compare the achievements of results.

#### Limitation

The study was limited to those schools which are situated in urban areas along busy roadside and facing high noise level in city Faisalabad of Punjab, Pakistan. The standard noise level was accepted in all world and it was measured by EPA (Environmental Protection Agency) in Punjab.

### III. RESULTS

**Table 1**

#### Measurement of Noise level

Sr#	Schools	NEQS Value)	(Desired Actual value (LAeq)	Remarks
<b>Boys Schools</b>				
1.	Govt. Jamia Chishtia H/S	65 db(A)	97.3 db(A)	High
2.	Govt. Sabria Sarajia H/S#1 Sanat Pura	65 db(A)	82.5 db(A)	High
3.	Govt. MC H/S School Allama Iqbal Road	65 db(A)	80.6 db(A)	High
4.	Govt. Crescent Model H/S	65 db(A)	86.2 db(A)	High
5.	Govt. A/V H/S Pc#1	65 db(A)	61.2 db(A)	Low
6.	Govt. Tech H/S Pc#1	65 db(A)	60.8 db(A)	Low
7.	Govt. M.C H/S Partap Nagar	65 db(A)	62.1 db(A)	Low
8.	Govt. M.C H/S Raza Abad	65 db(A)	59.7 db(A)	Low
<b>Girls School</b>				
9.	Govt. Girls H/S school Dijkot Road	65 db(A)	81.1 db(A)	High
10.	Govt. Girls H/S Partap Nagar	65 db(A)	83.5 db(A)	High
11.	Govt. M.C.G H/S Azafi#1 Pc#2	65 db(A)	75.6 db(A)	High
12.	Govt. M.C.G H/S Jhal Khanoana	65 db(A)	84.5 db(A)	High
13.	Govt. M.C.G H/S 279 R.B Kalan	65 db(A)	59.8 db(A)	Low
14.	Govt. M.C.G H/S Nisar colony	65 db(A)	61.4 db(A)	Low
15.	Govt. M.C.G H/S Mansoor Abad	65 db(A)	60.5 db(A)	Low

Above table 1 shows the measured noise level of selected 15 schools with the help of Punjab EPA Faisalabad. 8 male and female schools secured high noise level while 7 male and female schools secured low noise level. Let us analyse the achievement of results of students, as collected from the portfolios of

selected institutions.

**Table 2**

**Noise level and students' marks**

Sr#	Schools	NEQS Value)	(Desired Actual value (LAeq)	Marks %
<b>Boys Schools</b>				
1.	Govt. Jamia chishtia H/S	65 db(A)	97.3 db(A)	62%
2.	Govt. Sabria Sarajia H/S#1 Sanat Pura	65 db(A)	82.5 db(A)	61%
3.	Govt. MC H/S School Allama Iqbal Road	65 db(A)	80.6 db(A)	63%
4.	Govt. Crescent Model H/S	65 db(A)	86.2 db(A)	60%
5.	Govt. A/V H/S Pc#1	65 db(A)	61.2 db(A)	68%
6.	Govt. Tech H/S Pc#1	65 db(A)	60.8 db(A)	65%
7.	Govt. M.C H/S Partap Nagar	65 db(A)	62.1 db(A)	70%
8.	Govt. M.C H/S Raza Abad	65 db(A)	59.7 db(A)	69%
<b>Girls School</b>				
9.	Govt. Girls H/S school Dijkot Road	65 db(A)	81.1 db(A)	63%
10.	Govt. Girls H/S Partap Nagar	65 db(A)	83.5 db(A)	62%
11.	Govt. M.C.G H/S Azafi#1 Pc#2	65 db(A)	75.6 db(A)	60%
12.	Govt. M.C.G H/S Jhal Khanoana	65 db(A)	84.5 db(A)	60%
13.	Govt. M.C.G H/S 279 R.B Kalan	65 db(A)	59.8 db(A)	67%
14.	Govt. M.C.G H/S Nisar Colony	65 db(A)	61.4 db(A)	66%
15.	Govt. M.C.G H/S Mansoorab Abad	65 db(A)	60.5 db(A)	69%

**High noise levels schools**

Above analysis of data shows that students who read in that schools which are situated near roadside and having noise level above 65 db (A) show low performance according to their marks. As the above table show that all of these students falling in 60% to 63% marks which they attained in their educational career.

**Low noise level schools**

Above analysis of data shows that students who read in that schools which are situated away from roadside and having noise level low 65 db (A) show high performance according to their marks. As the above table show that all of these students falling in 65% to 70% marks which they attain in their educational career.

**Table 3**

**Analysis of hypothesis**

$H_{01}$  = There is no significance difference between the achievement of results of students of high Noise level schools and low noise level schools.

Sr #	Category	N	Mean	SD	DF	T-Value	Significant P. Value
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1.	Students	70	68.54	2.36			
2.	Students	80	61.51	2.03	148	19.594	.000

**T. (148) = 19.594, P < 0.05**

Table 3 shows that students of schools having low noise level have greater average grade marks (M= 68.54, SD= 2.36) and the students of schools having high noise level have low average grade marks (M= 61.51, SD= 2.03). T-test (T. (148) = 19.594, P < 0.05) indicates that students of low noise level schools have better academic performance than others. So, the  $H_{01}$  is rejected.

#### IV. DISCUSSION

The environment of school which is situated near roadside has a high rate of noise population. The constructions of building, roads developed the residential area surrounding the cities which will lead to cause the great grow of traffic, hence the noise pollution generate. So, the schools which are located to such residential area prone to noise problem either they become a fully equipped with infrastructures. There are limited acts and regulations about noise pollution and not strictly adopted thus the learning environment and learning outcomes highly affected (Gupta 2006).

#### V. CONCLUSION

The actions and attitudes of the different individuals who are related to the school community should be affected due to various physical elements i.e. noise pollution and as a result learning environment of a school should damage simultaneously. Therefore, it is necessary to find out the problem like noise pollution near these schools which are situated on roadside and remove these problems for better learning environment. Educational institution shapes the personality of the learners. The comfortable environment of the school plays pivotal role in promoting the academic performance of the students. So, school environment should be made free of distractions. Noise is one of the factors which lead to divert the attention of learners and teachers. Noise has effects on different abilities of students i.e. reading abilities, cognitive development, physiological indicators and motivational tasks, which is examined further.

#### REFERENCES

1. Gupta, (2006). Noise pollution and its impact on urban life. *Journal of Environmental Research and Development*, 1(3), 290-296.
2. Celik, E. & Karabiber, Z., (2000). Exposure-effect relations between aircraft and road traffic noise exposure at school and reading comprehension. *Am J Epidemiol.* (163) 27-37.
3. Shield, B., Dockrell, J., (2003). The effects of noise on children at school: A review. *Building acoustics 2003, 10, 97-116.*
4. Evans G.W., (2007). The influence of night-time noise on sleep and health. The Hague: Health Council of the Netherlands. Publication No. 2004/14E.
5. Traffic Noise Retrieved on
6. ([www.environment.gov.pk/PUB-PDF](http://www.environment.gov.pk/PUB-PDF)). August 10, 2014.
7. ([www.pjms.com.pk/issues/janmarch09/article/artile24](http://www.pjms.com.pk/issues/janmarch09/article/artile24)). August 10, 2014.
8. ([www.environment.gov.pk/PUB-PDF](http://www.environment.gov.pk/PUB-PDF)). August 10, 2014.
9. ([www.scribd.com](http://www.scribd.com)). August 10, 2014.