



Noise Pollution Assessment in Jamalpur Municipal Area, Bangladesh

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Abstract

Like other pollutions noise pollution is now a new threat for many cities of the world. The study was conducted to determine noise pollution in different zone of the Jamalpur sadar municipal area in the year of 2014. In total 45 samples were obtained from 15 locations covering 5 sensitive areas and the measurements were done at morning, afternoon and evening periods. The Noise level was determined by Sound Level Meter (Multi-function Environmental Meter, Model: ST-8820). All the studied areas showed higher than maximum allowable noise level where the highest average level of sound (87.33 dBA) was observed at traffic area during morning hours and lowest average level of sound (54.33 dBA) was observed at residential area during evening hours. A total of 100 respondents were selected to evaluate respondent's perception and effects of noise pollution. In the studied area, main noise source was traffic (57%) where small vehicle like auto bike and rickshaw were main culprit. Majority of the respondents claimed headache and heart bit problems due to traffic noise. The proper utilization of traffic enforcement laws was suggested by most of the respondents, driver and public awareness on noise pollution was also suggested to minimize noise pollution.

Keywords: Noise pollution, traffic, sound level meter, perception, public awareness.

Introduction

Noise means any unpleasant, unexpected, or undesired sound. Noise pollution enhances disruption of natural balance and hampers quality of life in urban areas. This problem has not been properly recognized but it became acute problems in developing countries^{1,2}. Urban area are expanding day by day but due to lack of proper planning and monitoring many silent and sensitive zones like school, college and hospitals were established in noisy area. The major sources of urban noise are industrialization, poor urban planning, transportation, social events, construction activities etc, where road vehicles considered as the number one source in urban areas³.

Noise with daily activities can causes sleep disruption, reduction in performance and environmental quality whereas cumulative with prolonged or repeated exposure cause adverse effects on human health like permanent loss of memory or a psychiatric disorder⁴ and it impairs the quality of life. There are also some evidences that extended exposure to high noise levels enhanced cardiovascular diseases, including high blood pressure and irregular heart beat^{5,6}. It has also negative economic effects, especially on tourism and real estate sectors. The Department of Environment (DoE) conducted noise pollution survey in many silent areas of Dhaka, Chittagong and Khulna cites and found that most of the studied areas showed noise level exceeding the DoE permissible limit⁷.

Jamalpur Municipality area with a population of 120,955 is one of the noise polluted area due to increasing small vehicles and inadequate roads and street. Taking the above point the present study was conducted to determine noise pollution level on

different zone of Jamalpur Municipal sadar area. People's perception and effect of noise pollution on the human health and environment was also evaluated.

Material and Methods

The present study was conducted at fifteen different locations covering residential area, educational area hospital area, traffic area and official areas in the Jamalpur Municipality showed in figure-1. Jamalpur Municipal area is 53.28 sq km, located in between 24°42' and 24°58' north latitudes and in between 89°52' and 90°12' east longitudes. It has 12 wards and population is 120955.

The ambient noise level was monitored during morning (0800 - 1000 hrs), afternoon (1300-1500 hrs) and evening (1900-2100 hrs). The noise monitoring was conducted at three consecutive working days in April, 2014. Noise levels were measured by a sound level meter (Multi-function Environmental Meter, Model: ST-8820, Made in China). The intensity of the noise is most conveniently measured in dB decibel (dB) ranges from 0 to 140 dB. Details about the sound level meter and monitoring was mentioned in previous research paper of our team¹⁰.

The survey was done near the data collection points of Jamalpur municipality area. The people of different ages and sex were selected to get the information about traffic noise pollution using random sampling method. Survey data were collected through in depth interview of respondents. To obtain information, a questionnaire was prepared representing all the aspects of noise. Collected data were grouped and tabulated, finally computer program such as SPSS program and Microsoft excel were used to process and analyze the data.

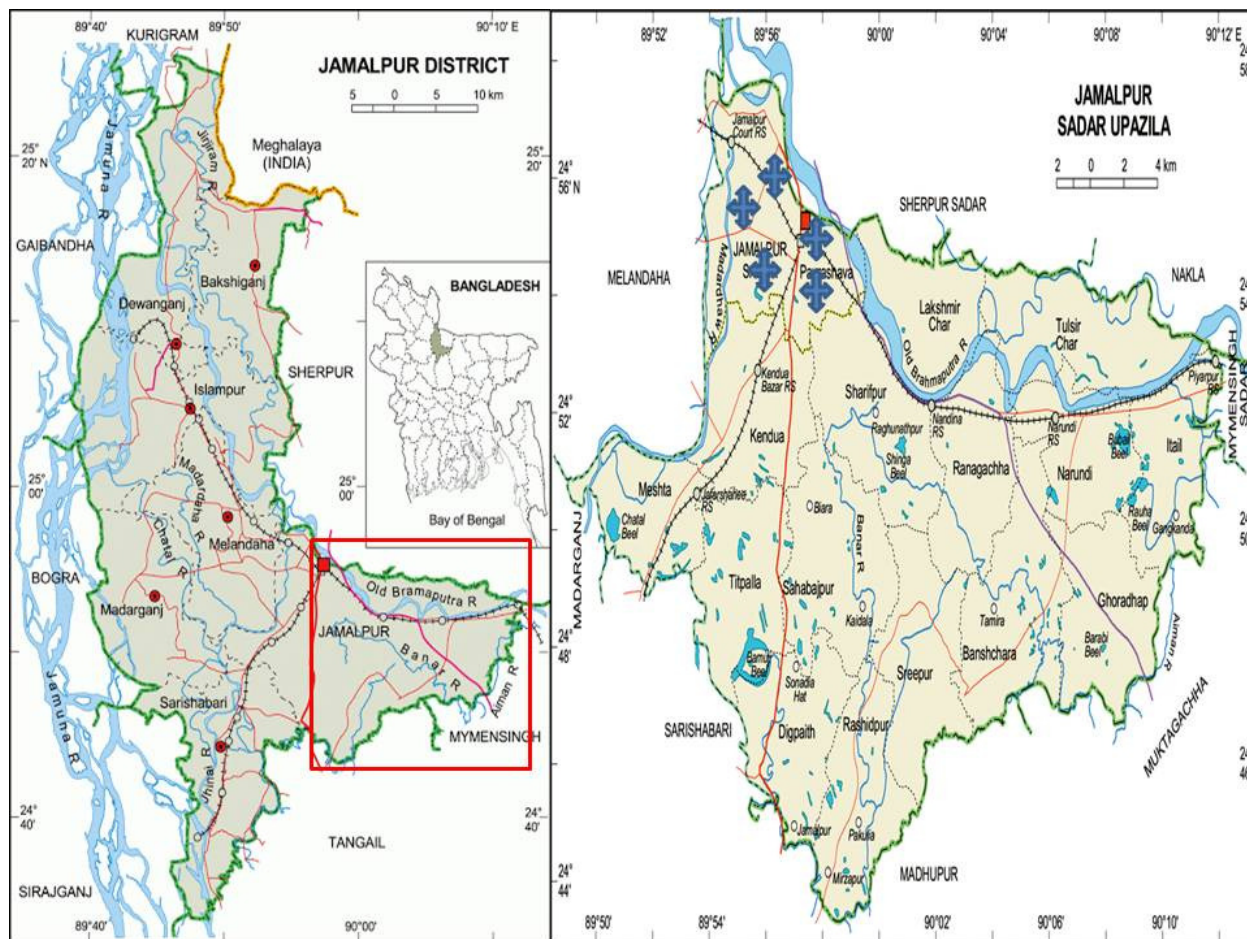


Figure-1
 Study site (cross mark indicate the location of sampling area)

Table-1
 Noise quality standards by area and time

Area code	Permissible noise limit (dB)	
	Day (6 am to 9 pm)	Night (9 pm to 6 am)
Silent area	45	35
Educational area	40	30
Residential area	55	45
Commercial area	65	55
Industrial area	75	65

Source: Environment (protection) Rules, 1986⁸

Results and Discussion

The noise levels at different periods of the day at different locations of Jamalpur municipal area are presented in table-2. The highest average level of sound (87.33 dBA) was observed at Doyamoye Mur Traffic area and lowest average level of sound (54.33 dBA) was observed at Lichutola Residential area. In morning hours highest average level of sound (87.33 dBA) was observed at Doyamoye Mur Traffic area and lowest average level of sound (55.65 dBA) was observed at Lichutola

Residential area. In afternoon hours maximum average level of sound (84.66 dBA) was observed at Doyamoye Mur Traffic area and minimum average level of sound (55.65 dB) was observed at Lichutola Residential area. In evening hours maximum average level of sound (79.33 dBA) was observed at Doyamoye Mur Traffic area and minimum average level of sound (55.33 dBA) was observed at Mother and child care hospital. Among the educational areas highest noise level was found in Jamalpur Zilla School at morning hours and lowest noise level was found in Govt. Ashek Mahmud College at evening hours. In case of residential areas maximum level of noise was observed in front of Noya para at evening hours and minimum average level of sound (55.65 dBA) was observed at Lichutola at afternoon hours. Among the hospitals, highest recorded noise level was 83.66 dBA at Jamalpur medical college and hospitals during morning hours and recorded lowest average level of sound was 55.33 dBA at Mother and child care hospital during evening hours. In case of traffic areas, maximum at Doyamoye Mur Traffic area during morning hours and minimum at Bokul Tola Mur during evening hours. In case of official areas highest noise level was recorded near District Court area during morning period and lowest noise level was recorded at the same area during evening periods. The maximum value recorded was 90.7

dB at silence zone during evening hours while the minimum was 60.2 dB residential zone during evening hours in Dhar Town MP, India⁹. It was reported that in Tangail municipal area highest average level of sound (85.6 dBA) was observed at New bus stand and lowest average level of sound (69.0 dBA) was observed at university area¹⁰. It was also reported that the perfect sound condition for Bangladesh is 45 dBA for the day-time and 35 dBA for the night in peaceful areas and 50 dBA for the day-time and 40 dBA for the night in residential areas¹¹. One study conducted in Morena city Madhya Pradesh, India reported that all the studied zones (commercial, silent and residential) showed exceeded the standard level of noise prescribed by CPCB¹².

The mean noise value with comparison with allowable standard is shown in figure-2. The standard value for respective area was taken from table-1. All the studied areas showed higher than maximum allowable noise level during all studied periods (morning, afternoon and evening). Similar results were also reported in case of India^{9,12}. Maximum deviation was observed in educational areas followed by hospitals and traffic areas. In all studied zones, sound level was high during morning hours when maximum numbers of people come out from homes for multiple purposes.

One hundred respondents were randomly selected for questionnaire survey in Jamalpur municipal area when they were asked about the main causes of noise pollution. Figure-3 revealed that the most common identified causes of noise pollution were vehicle, loud speaker of miking and human gathering. Similar result was reported for Tangail municipal area¹⁰. It was also reported that traffic noise was the major noise source in urban area^{3, 13,14}. From figure-4 it is found that the most noise making vehicle was auto bike followed by rickshaw where bus and train were moderate noise made in Jamalpur municipal area. There are no large industries in Jamalpur

municipal areas many people therefore moved everyday from Jamalpur to Dhaka (Capital city) and other places for job and trade purposes. They often used small vehicles to catch train and bus. As outgoing people increases in Jamalpur the numbers of small vehicle was also increased.

Figure-5 stated that about horn using conditions, majority of respondents (31%) said about traffic jam while parking (27%), overcrowding (19%), overtaking (13%) was also claimed by the respondents. Very few of them (10%) claimed for unnecessary horn was used. The effects of noise pollution are showed in figure-6. Majority of the respondents suffered from headache (41%) and heart beat (30%) and comparatively lesser number were affected by hearing problem (12%). Related to health and negative impacts, 52% of the residents reported to have encountered headache, 30.5% had hearing problem due to urban traffic noise in Morogoro¹³. Noise pollution could lead to headache, mental stress, sleeplessness, high blood pressure, cardiac failure, respiratory disorders as well as miscarriage of childbearing women, low-birth weight for premature birth and breaks attention of students to their studies¹⁴. A professor of audiology at University College in London stated that noise pollution causes more deaths than heart diseases around the world¹⁵. Measures for controlling urban traffic noise pollution and presented in the figure-7. The result showed that Suggestion for controlling noise pollution included enforcement of law (40%), driving awareness (25%). The rest supported public awareness and banning of hydraulic horns to reduce noise pollution. Only a small percentage of them mentioned about all the aforementioned measures. About 50% students suggested that public awareness can reduce noise pollution while driving awareness and banning of hydraulic horns will help to reduce noise pollution in Tangail municipal area¹⁰. Ban of hydraulic horn and improved traffic control was the major action to be taken to control urban traffic noise in Morogoro¹³.

Table-2
Status of noise level at various areas in Jamalpur municipality

Area code	Category of area	Location of sites	Noise level (dBA)		
			Morning	Afternoon	Evening
A	Educational areas	Govt. Ashek Mahmud College	66.33	62.66	58.02
		Jamalpur Zilla School	72.65	71.45	66.26
		Govt. Girls High School	70.67	72.13	63.48
B	Residential areas	College road	66.66	58.66	57.32
		Noya para	68.33	64.66	68.66
		Lichutola	55.65	54.33	57.66
C	Silent areas (Hospitals)	Jamalpur medical college and hospitals	83.66	80.15	70.08
		Mother and child care hospital	62.33	57.66	55.33
		Central hospital Ltd.	70.05	70.11	66.33
D	Traffic areas	Panch ratar Mur	80.16	82.66	72.66
		Doyamoye Mur	87.33	84.66	79.33
		Bokul Tola Mur	68.33	74.33	69.66
E	Official areas	DC office	71.05	72.05	63.33
		SP office	71.22	69.35	62.28
		District Court	79.66	78.33	61.66

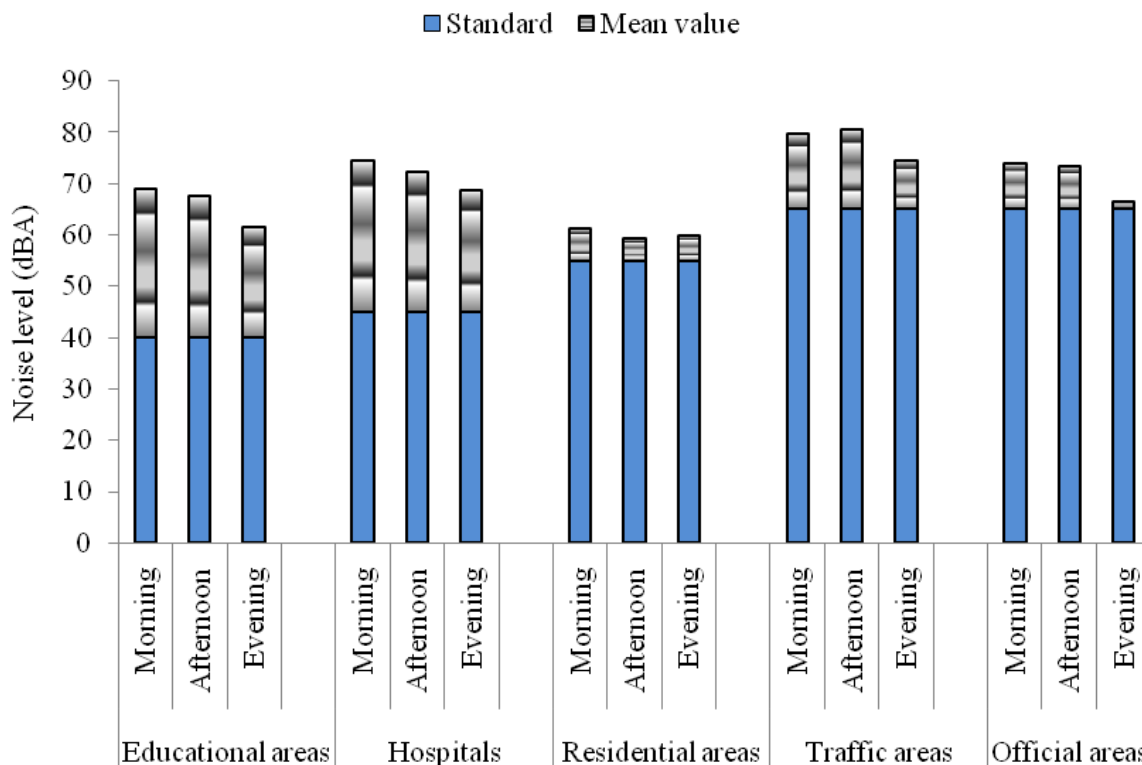


Figure -2
 The mean value of sound level in sampling locations in different time in comparison with standard value

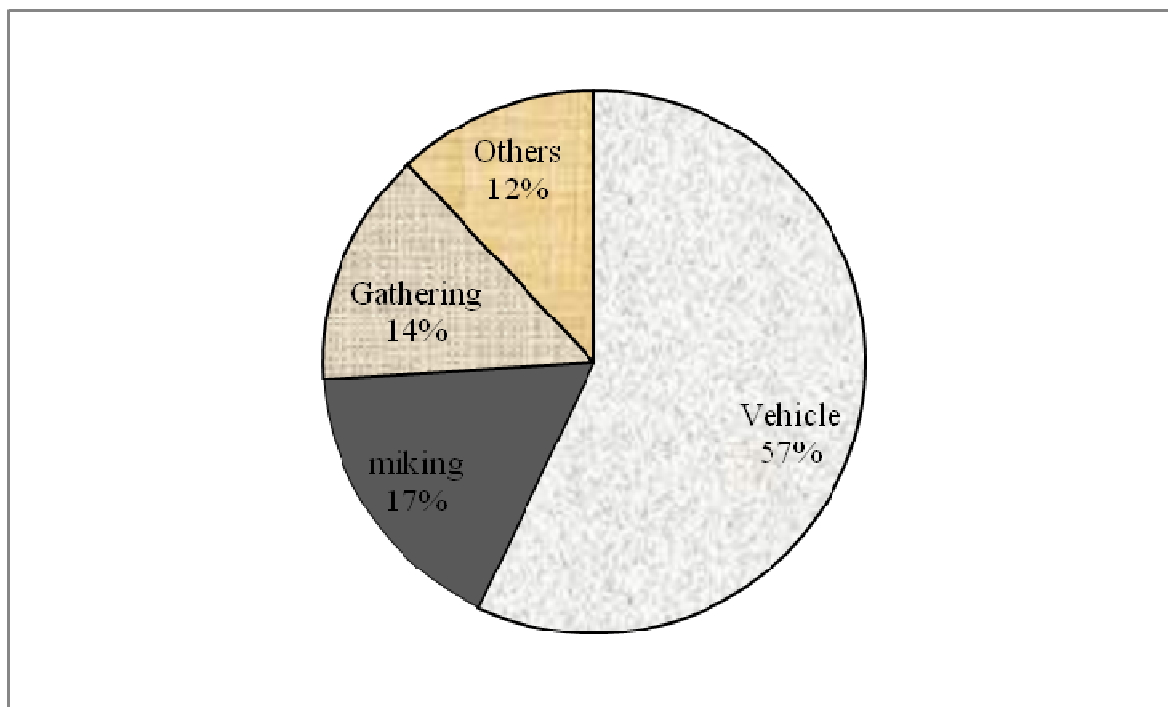
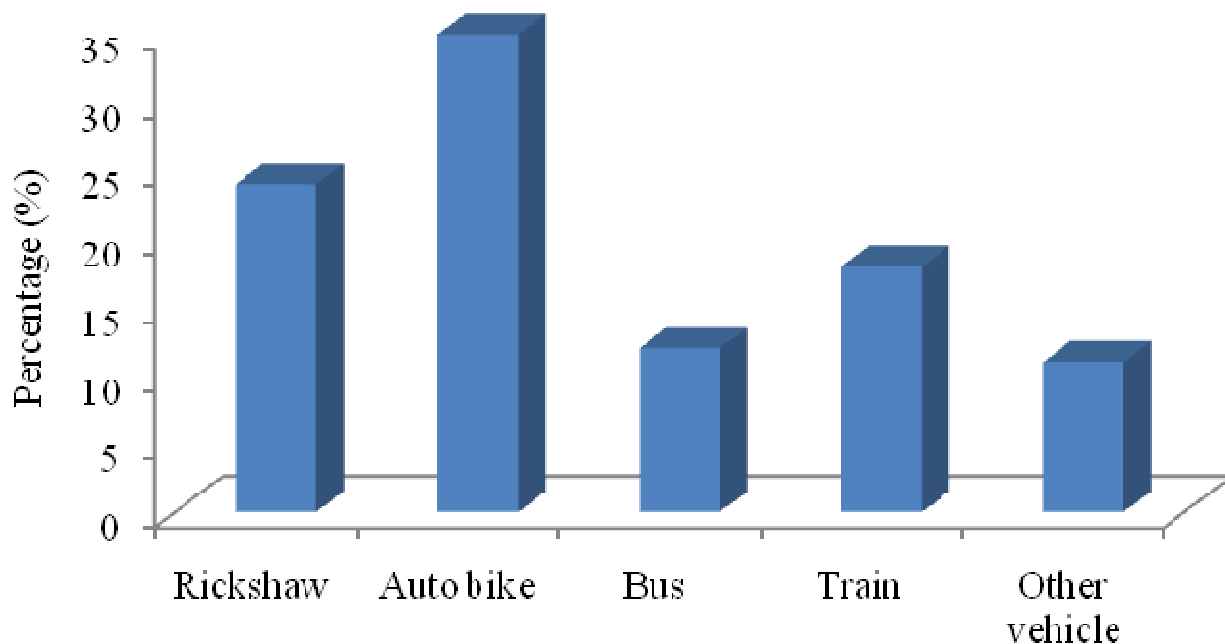


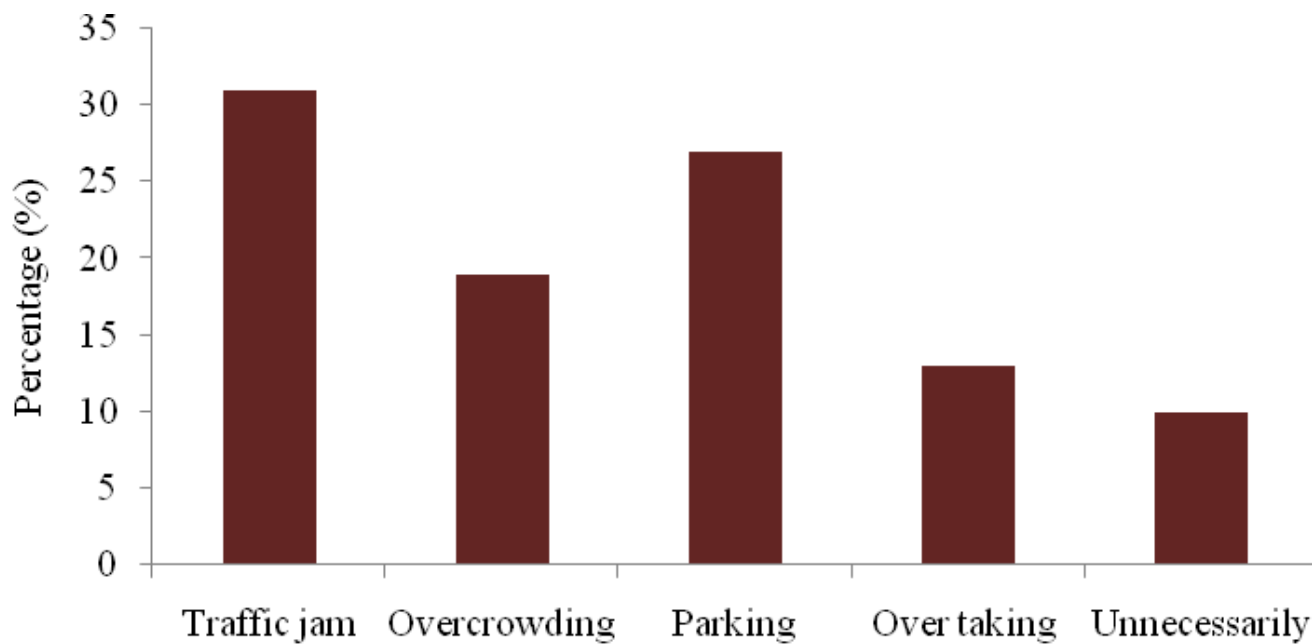
Figure -3
 Causes of noise pollution in Jamalpur Municipality



Noise making vehicles

Figure-4

Noise making vehicles in Jamalpur Municipality



Causes of using horn

Figure -5

Horn using situation in Jamalpur Municipality

Heart beat ■ Drowsiness ■ Headache ■ Hearing problem

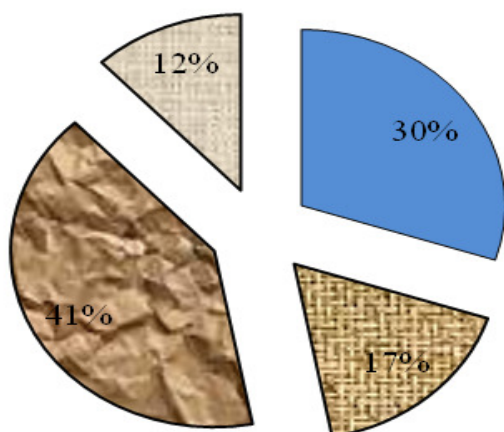


Figure -6
Health effects due to noise pollution

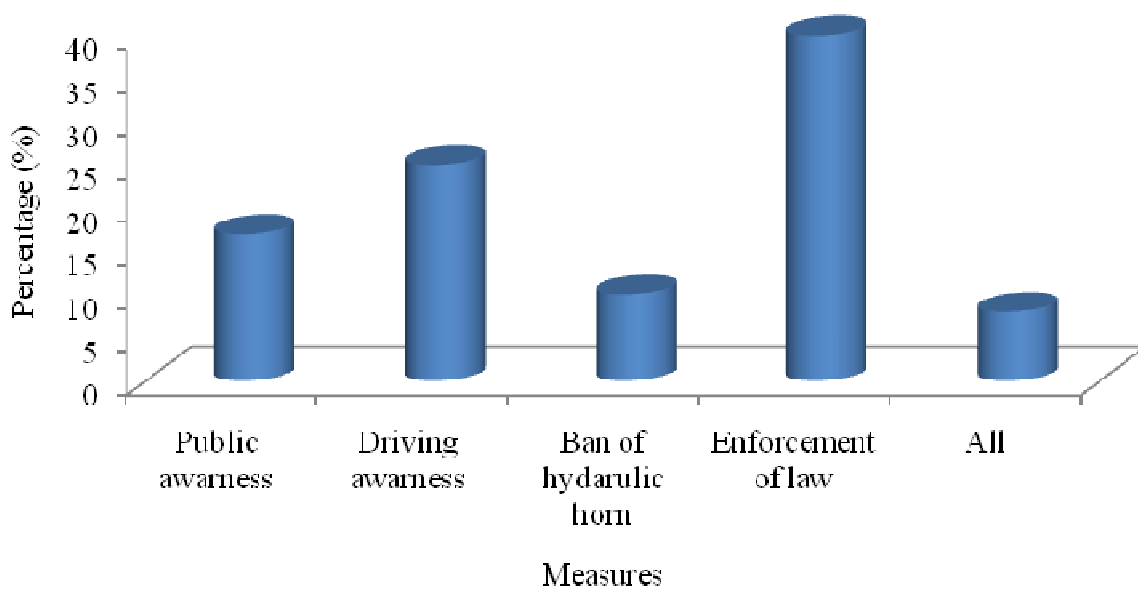


Figure-7
Action measures for controlling noise pollution

Conclusion

Outgoing activities from the small city to large city is increasing for multiple purposes. The noise pollution status of Jamalpur municipal area represented that morning hours were the noisiest periods in the study area. All the living zones showed higher than standard allowable limit while educational and hospital areas were most noisy and residential areas quite less noisy. The most common identified causes of noise pollution were vehicle, loud speaker of miking and human gathering. The most noise making vehicle was auto bike followed by rickshaw. A Majority of the respondents suffered from headache and heart beat. Some

suggestions such as enforcement of law, driving awareness, public awareness and banning hydraulic horns can improved the present situation of noise pollution.

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