

NOISE POLLUTION, ITS CAUSES AND IMPACTS ON URBAN LIFE: BANGLADESH CONTEXT

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ABSTRACT

Noise pollution is, in addition to water and air problems, one of the emerging hazards that affect the quality of life in Bangladesh, especially in its capital city Dhaka, badly. In most of the places of the metropolitan area, the level of noise pollution exceeds specified standard limits by as much as 20dB. It does not fall below 55dB even in the morning hours in the so-called silent zones. The World Health Organization (WHO) reported a number of adverse effects of long exposure to moderate level noise or sudden exposure to excessive noise. The majority of the citizens of Dhaka have been reported not to be aware of the adverse effects of noise pollution. Even they do not think of noise as a pollutant and treat it as a part of their daily life. However, people nowadays have started realizing the adverse impact of noise pollution and the importance of noise pollution control. But, people are not properly aware of the issue. Therefore, there is still much work to be done to educate the people in this regard. The concerned authorities' actions in this regard are not adequate enough to address this burning issue properly. Moreover, the existing environmental regulations in Bangladesh are also not satisfactory to deal with this invisible enemy. Therefore, this paper aims to determine the causes of noise pollution and its impacts on urban life; scrutinize the prevailing related laws and policies, and conclude with recommendations to stop noise pollution. The paper makes use of secondary data *i.e.* books, articles, national and international law reports, Acts, etc.

KEY WORDS: Bangladesh, Dhaka, Noise pollution, Human health, Urban life.

INTRODUCTION

Sound is considered as noise pollution when it, according to the definition of the World Health Organization (WHO), exceeds 65 decibels (dB). Noise becomes harmful, to be precise when its level surpasses 75 decibels (dB). According to the WHO's recommendation, the sound level must be kept below 65 dB during the daytime while it must be below 30 dB at night (Kelishadi, 2012). At present, noise pollution has become one of the major problems in Bangladesh, especially in the capital city Dhaka and other metropolitan cities. In addition to the water and air pollution, noise pollution has fueled the suffering of the people. According to a study recently revealed by the Department of Environment (DoE, Bangladesh), the sound level in Dhaka and other metropolitan cities in the country is

far beyond the acceptable limit. The study finds the average sound level, in some main areas of the Dhaka city such as Kollanpur, Gabtoli, Kawran Bazar, Shamoli, Farmgate, Mohammadpur, Shahbagh, and Mohakhali Bus Terminal, between 80-110 dB which is almost twice in number than the maximum noise level a human can tolerate (*The Daily Star*, 31 Dec 2019). In the midst of this situation, along with other countries Bangladesh is set to observe the 26th International Noise Awareness Day this year (2021). Founded by US-based Center of Hearing and Communication (CHC), the day to be observed on the last Wednesday of April aims to raise awareness of the harmful effects of noise on hearing, health, and quality of life, and inspire positive action in the community. According to the WHO, about five percent of the global population suffers from noise

pollution. 45 dB is regarded as a safe level of sound for human beings. But when the sound exceeds the level of 65 dB, it can cause heart disease while that of 90 dB can cause ulcers, hearing problems, and changes in the nerve system. Consequently, sound exceeding the level of 120dB can hurt in the ears and destroy hearing ability gradually (Razzaque *et al.*, 2010). According to the WHO, about five percent of the global population is exposed to sound pollution and they are struggling with several kinds of health hazards due to complexities related to noise pollution. In Bangladesh, around 11.7% out of the total population have lost their ability to hear due to noise pollution, DoE study finds. In order to check the noise pollution, the government has enacted a law entitled Bangladesh Sound Pollution (Control) Rules, 2006 where it states surpassing the maximum noise level in a particular area is a punishable offence. As per the rules, the authority prohibits using a stone breaker machine in any residential area. It also asserts to take permission from the DoE authority for arranging any social or religious program that can produce loud noise in the residential area. However, the implantation of these rules is a great challenge to the authority. The present study found these rules hardly maintained. Two prime sources of noise pollution in the metropolitan areas are traffic jams and loud horns. In the capital city Dhaka, traffic jam is a regular scenario. It is found that in Dhaka, around 500-1000 vehicles blare simultaneously when stranded in rush hour gridlock (Alam *et al.*, 2019). Using megaphones or speakers during any social, political, and religious event, construction work, and factory noise are other sources of noise pollution in Bangladesh. The inhabitants of various regions in Dhaka grumbled about how noise pollution affects their day-to-day life badly. Aside from gridlock, these vehicles also produce a great deal of noise-causing severe health complexities including blood pressure, stomach ulcers, brain stroke, amnesia, and different types of mental illness.

NOISE PARAMETERS MEASUREMENT

The definition of the nature of the noise is determined by the sound level, its frequency spectrum, and variation over time. Although the degree of noise largely depends on the subjective perception of the listener's loudness, the term sound level refers to a physical measure that is a function of the magnitude of variations in sound intensity.

Sound strength and sound pressure are the most essential sound level metrics. The average rate of sound energy transmitted perpendicular to the sound propagation direction across a unit area, usually measured in pW/m², is sound intensity (also known as sound power density). As the force level of a source can hardly be quantified by any instrument, the sound pressing factor is used as a metric in such a manner. The sound pressing factor typically corresponds to the square base of the sound power. As a consequence of managing a large variety of quantities, a logarithmic metric called decibel (dB) is used to represent the sound frequency. The sound frequency of the decibel is defined as follows:

$$\text{Sound level, () } 10\log (/) 20\log (/) 10 0 2 L \text{ dB} \\ = 10 P P_0 = P P \quad (1)$$

Here, 'P' is the root mean of the sound pressure square value (N/m²) and P₀ is the normal reference pressure (20 iN/m²). The decibel scale ranges from zero, the hearing threshold, to about 140 dB for practical purposes, and the onset of pain. The perceived loudness of sound is doubled with each 3-decibel rise in sound intensity (Chowdhury *et. al.*, 2010). Weighing filters are used when calculating the sound intensity in order to account for the ear's sensitivity to various levels of noise. The A-weighting sound level is designed to more accurately reflect the subjective response of an individual to the sound variation. A-weighting is also widely used for the assessment of ambient noise and industrial noise, although initially intended only for the measurement of low-level vibrations, as well as for the evaluation of possible hearing impairment and other noise health effects at all sound levels.

NOISE POLLUTION IN CAPITAL CITY DHAKA: AN ALARMING HEALTH HAZARD

Noise pollution has become a serious health hazard to the inhabitants of Dhaka, the capital city of Bangladesh, posing various physical and psychological problems. The number of uncontrolled vehicles is increasing over the days. Consequently, the degree and intensity of noise pollution have on the rise resulting in hearing impairment of the city Dhaka. It also is affecting the social environment of the city. Indeed, noise pollution in the city has so far gone beyond control due to inadequate implementation of the Noise Pollution Control Rules, 2006 by the authorities

Table 1. Maximum noise levels in different areas.

Areas	Maximum noise level
Residential areas	55 dB at 6am-9pm; 45 dB at 9pm-6am
Hospitals, education institutions, place of worship	40-45 dB
Public areas, i.e. markets, playgrounds, parks	60-70 dB
Commercial or industrial areas	70-75 dB

Source: Bangladesh Noise Pollution (Control) Rules, 2006.

Table 2. Human tolerance for different noise levels.

Noise level	Maximum duration of exposure
75dB	Comfortable for human hearing
90 dB	2 and half hours
100dB	15 minutes
110dB	30 Seconds
120dB	9 seconds
140dB	1 second

Source: World Health Organization (WHO).

Table 3. Noise levels in major cities in Bangladesh.

City	Highest	Lowest
Dhaka	132dB	47dB
Sylhet	131dB	50dB
Khulna	132dB	42dB
Barishal	131dB	54dB
Rangpur	130dB	46dB
Rajshahi	133dB	56dB
Mymensingh	131dB	54dB
Chattogram	133dB	47dB

Source: Department of Environment (DoE), Bangladesh.

concerned and lack of public awareness of the rules. As per the rules, a fine of Tk 100 can be levied on vehicles for breaching various traffic rules by the mobile courts of traffic police in compliance with the Motor Vehicle Ordinance 1983. The vehicle drivers pointlessly employ their hydraulic horns generating loud noise. City Dhaka, mainly students, cannot focus on their studies and have a sound sleep because of the intolerable sound of the horns (Faruque, 2017). According to a provision in the rules, a person may face one-month imprisonment or fined Tk 5,000 or both, and a maximum of six-month imprisonment or Tk 10,000 or both for breaching the noise pollution control rules. However, these rules are scarcely followed. Noise pollution in Dhaka city is, as various studies demonstrated, is three times higher than the level set in the noise pollution control rules.

Various studies on the level of noise pollution in Dhaka city demonstrated that the sound level, in

fact, to be three times higher than the level set in the noise pollution control rules. During the off-peak hour, between 9:00 pm and 6:00 am, the studies have set 130 dB as the maximum level of sound while 127 dB in the so-called silent zone after 9:00 pm (Hossain, 2004). The standard for silent zones was set at 50 decibels during the day while at night it is 40 decibels. As indicated by the Motor Vehicles Ordinance 1983, any vehicle that produces in excess of 85 decibel sound after starting the engine will not be certified for clearance while installing hydraulic horns in vehicles are completely prohibited. In reality, most of the buses and trucks are using prohibited hydraulic horns posing a serious threat to public health. Traffic police, on its part, asserts that they can only impose a fine of TK 100 for using hydraulic horns in compliance with Article 139 of the Motor Vehicle Ordinance 1983. They allege that they are authorized only to enforce this single mother act and have no way to go beyond it. Traffic police assert that during their drive they can only enforce the motor vehicle act, not the noise pollution control rules. Whenever there is a joint-drive, then the environment department can authorize the noise pollution rules, they assert.

The decision-makers, politicians, planners, and engineers must come forward to maintain the noise level within a reasonable limit, taking into account the physical and mental health of the city Dhaka, especially the children (Singh *et al.*, 2004). According to the Environment and Forestry Protection Law-1997, the area around hospitals or educational institutions or special institutions/establishments identified by the Government up to a radius of 100 meters are designated as Silent Zones where the use of vehicle horns or other audio signals is prohibited and loudspeakers are prohibited. But, the real scenario is that this section is hardly maintained. It is imperative to take effective initiatives by the government to make people aware of the harmful effects of the noise pollution as well as the noise pollution control rules. The proper implementation of the rules is a must to prevent the noise pollution.

LEGAL FRAMEWORK ON NOISE POLLUTION

There is no way to deny the fact that noise pollution has emerged as one of the severe environmental problems in Bangladesh. Taking the problem into consideration, the government formulated Noise Pollution (Control) Rules, 2006 under section 20 of the Bangladesh Environment Conservation Act, 1995. Rule 4 in the act leaves every Union Parishad (local administration unit), Pourashava, City Corporation, RAJUK (Rajdhani Unnoyon Kortipokkho), and city development authorities to set up standard sign or signboard in the residential, commercial, and industrial areas. According to Rule 5, the basis of standard as specified in the Schedule will be followed to determine the maximum standard of noise (Noise Pollution Control Rules, 2006). Schedule-1 covers the standard of sound in each area while Schedule-2 covers the vehicle sound standard. Meanwhile, Rule 6 allows the Department of Environment to define the standard of noise with the help of equipment they approve while Rule 7 asserts that the limit of the maximum standard of noise must not be exceeded by any individual or institution. To note that the Noise Pollution (Control) Rules 2006 sets 50 decibels as the acceptable level of sound in residential areas during daytime and 40 decibels at night. In order to prevent noise pollution and determine the permissible standard of noise in different areas, the government has enacted the Noise Pollution (Control) Rules in 2006 under the Section 20 of Bangladesh Environment Conservation Act 1995. The Rules set the allowed standard of noise for both day and night-time in five categories: silent areas, residential areas, mixed areas, commercial areas, and industrial areas. Hospitals, educational institutions, offices, and similar structures and their surrounding 100-meter areas form the silent areas. As per the Rules, the sound level in silent areas will not exceed the maximum 50 dB during daytime while 40 dB at night while the standard of the sound level in the residential area during daytime and at night will not cross 55 dB and 45 dB respectively. The highest level of noise is allowed in the industrial areas: the maximum acceptable limit during daytime is 75 dB while that of at night must not exceed 70 dB. The Rules also set the hours between 6 am and 9 pm as daytime while the rest hours as night-time. Schedule-2 of the Rules also prescribes a separate range for vehicle noise, prohibiting the use of horns in silent areas. However,

for social gatherings (marriages), cultural activities (sports, festivals, meals, hats, and bazaars), or political events in open or partially open spaces, the normal sound level may be surpassed (Bangladesh Environmental Protection Act, 1995). In that case, the organizers must obtain permission from the concerned authorities three days before the event. If there is an emergency situation created, permission can also be obtained just one day before the event. In such cases, however, the length of the approved time must not exceed five hours and, in any case, the extension of the period may only be up to 10 pm. The rules also forbid the use within 500 meters of any residential area of machinery used for the processing and decomposition of building materials (bricks, stones, etc.) and such machinery cannot be used between 7 pm and 7 am without the permission of the authorities concerned. In addition, the Rules allow any person, either verbally or by telephone or in writing, to convey any complaint concerning excessive noise or infringement of the Rules to the authorities concerned. The Rules also provide the officials, empowered under the 1995 Act, to enter into any establishment and seize any noise generating equipment.

In compliance with the rule, the concerned officials can provide written instruction for the infringement of the specified limits, and failure to comply with the instructions is a punishable offence with up to one-month jail and/or fine up to 5,000 BDT. If anyone repeats the same offence, he/she can face imprisonment up to 6 months and/or fined up to 10,000 BDT. However, the rules do not extend to any religious event in mosques or temples and activities involving major national events such as Independence Day, Bengali New Year, International Mother Language Day, etc. Moreover, with major announcements made by government organizations and during the official activities of the military or law enforcement agencies, the laws do not apply. In addition, the Rules for National and Local Election Campaigns provide for exclusion in all regions, with the exception of silent areas, subject to the authorization of the Election Commission or other authorities concerned.

RECOMMENDATIONS AND CONCLUSION

For the existence of living and nonliving organisms, a safe and sound environment is very crucial. The lives and biodiversity will face extinction if the environment is extremely polluted. Hence, it is high

time the global leaders and the concerned authorities focused on reducing the present ratio of the noise pollution. According to the WHO, awareness is a must to beat the noise pollution, the invisible enemy. Some of the best examples of activities that can contribute to easing noise pollution can be avoiding very noisy recreational activities, choosing alternative ways of transport instead of the car, such as bicycles or electric-run vehicles, completing housework within specified hours, isolating homes with materials that absorb noise, etc. One of the formidable and integral parts of environmental education is educating the younger generation. Taking the present scenarios and its harmful effects on public health, the government must need to give focus on:

- Formulating a long-term policy in order to reduce noise pollution;
- Conducting various awareness campaigns to make people aware about the causes and negative impacts of noise pollution;
- Arranging effective training on how to establish an environment-friendly noise;
- enacting new laws that include preventive and appropriate measures and amending the existing laws to prevent the noise pollution;
- fostering research activities to develop new technology for preventing noise pollution;
- Implementing and strict monitoring of the proper application of the existing laws related to noise pollution;
- Launching a specialized web portal by the concerned authority where all pieces of information regarding the noise pollution, its sources, causes, and solutions will be stored.

The WHO declared Dhaka, the capital city of Bangladesh, as one of the most polluted cities in the world. The government should take necessary actions to prevent noise pollution. Ensuring proper noise management is a must for reducing this invisible enemy. For example, the government may take some necessary steps: protect particular areas or zones from noise, such as parts of the countryside, areas of natural interest, city parks, etc., enforce new legislation with strict preventive and appropriate measures, and separate areas according to their requirements such as residential and industrial areas, the establishment of noise insulation in new buildings, the replacement of

standard asphalt with more effective alternatives that can, among other things, minimize traffic noise by up to 3 dB.

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