

Non-Auditory Health Hazard Vulnerability to Noise Pollution: Assessing Public Awareness Gap

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ABSTRACT: *In Dhaka, one of the top ten megacities in Asia and the capital of Bangladesh, the problem of noise related pollution is prevalent. In almost every part of Dhaka city, the levels of noise which are established by W.H.O. are regularly exceeded, thus prompting adverse health effects on its inhabitants. This sort of pollution is more acute in central portion of Dhaka than its periphery. Therefore, if the greater Dhaka is taken as a study area, the central's problem may be underestimated. This study is prepared to find out the actual condition of auditory and non-auditory health effect of noise among roadside people and provide recommendation to ameliorate the same and consequently reduce noise level in Dhaka city as an effort to make Dhaka a better place to live in. The result shows that both auditory and non-auditory effects of noise are at alarming condition in all zones of the city.*

KEYWORDS: *Dhaka, Decibel, Health hazard, Noise, Pollution*

1. INTRODUCTION

Noise, an important element of environment and also undoubtedly a source of atmospheric pollution. Noise is a part of daily life although when surpassed the acceptable limit, becomes pollution. Dhaka, the capital of Bangladesh, is one of the most atmospheric polluted cities in the world. In spite of epic adverse health effect of such pollution, there is less work done for Dhaka city in this regard. Almost all the previous studies focused on health of elderly, children or pregnant women due to excess noise but overlooked those who are exposed to such environment for at least eight hours. Hence, this paper concentrated to the people who work under high decibel of noise in the street namely street hawker and roadside vendors.

II. OBJECTIVE AND SCOPE OF THE STUDY

The goal of the study is to evaluate the present state of adverse health effect due to noise pollution on the people who are more exposed to noise than others (like roadside shopkeepers, traffic police, rickshaw puller and street hawker), identification the causes and to develop appropriate remedial measures according to the define causes.

III. METHODOLOGY

3.1. Study Area

Study areas of this project were central Dhaka city which are further divided into five categories namely residential, silent, commercial, industrial and mixed area. Finally ten location were selected, two under each area. Motijheel and Newmarket, Farmgate and Mouchak, Shahbag and Agargaon, Mohakhali and Mirpur-10, Moghbazar and Gulshan were selected as a representative of commercial, mixed, silent, industrial and residential area respectively. Further the selected locations were divided into two sections.

- Main Roads: Specially the intersections and major roads which connected Dhaka city roadway network.
- Outside Buildings: Especially those buildings which are located 100 meters or less from the selected intersections.

3.2. Procedure

- At the onset of the study, intersections of the selected zones were taken under supervision as a study area.
- People who are most exposed to noise were further divided into two categories. They are: Roadside Shopkeeper and Street Hawker.
- Effects of noise were categorized as auditory and non-auditory, and then three non-auditory effects were selected arbitrary.
- A survey questionnaire was prepared.
- Collection of data through this survey among the selected categories of people in all selected intersections having any age group.
- After collecting all necessary data, an analysis is conducted.
- A recommendation is drawn from the analysis.

IV. REVIEW OF LITERATURE

4.1. Background

Dhaka is known to be one of the busiest, noisiest and over-crowded modern cities in the world. The range of noise pollution has been causing different types of public health hazards. Millions of people regardless of age-groups are being affected every year due to continued exposure to the deafeningly loud noise leading to deafness to even heart ailments.[daily sun]. This is mainly an urban phenomenon and affects mostly who works outdoors, for example the rickshaw-puller, street vendors, traffic police, small shopkeepers etc. ^[1]

4.2. Noise Measuring Unit

The intensity of sound pressure is measured by decibel. The decibel is a logarithmic unit used to express the ratio between two values of a physical quantity, often power or intensity. ^[2] This unit is expressed as dB.

4.3. Noise Level Standards in Bangladesh

According to the Department of Environment, Bangladesh, the level of noise in Bangladesh should be as follows

Table I: Noise quality standards, by zones and time of day ^[3]

Serial No.	Category of Areas	Limits in dB	
		Day time (6 am- 9 pm)	Night time (9 pm- 6 am)
1	Silent Area	45	35
2	Residential Area	50	40
3	Mixed Area	60	50
4	Commercial Area	70	60
5	Industrial Area	75	70

4.4. Scenario of Dhaka

Noise of any busy street in Dhaka city has been estimated at 60 to 80 dB , with the sound of vehicles being 95 dB , loud speakers 90 to 100 dB ,mills and factories 80 to 90 dB , restaurants and cinema halls 75 to 90 dB , scooter or motorbike 87 to 92 dB , trucks and buses 92 to 94 dB . But the desired sound measure is 25 dB in

the bedroom, 40 dB in the dining or drawing room, 35-40 dB in the office, 30-40 dB in the classroom, 35-40 dB in the library, 20-35 dB in hospital, 40-60 dB in a restaurant and 45 dB in the city at night. However, according to World Health Organization (W.H.O.), generally 60 dB sounds can make a man deaf temporarily and 100 dB sounds can cause complete deafness. ^[4]

4.5. Sources of Noise Pollution

The sources of noise pollution fall into two categories: the indoor and the outdoor sources. The indoor sources include watching TV in high volume; listening to music in radio, cassette recorder, i-pod, CD or DVD players, mobile-phone ring-tones or alarm-tones, playing computer games with intense sound effects. It may even be playing a guitar or drums or other musical instruments with the help of an amplifier or other electrical appliances or power tools like drill machine or a lawnmower. ^[5]

But the outdoor sources play a fatal role in disturbing the environment and public-health. Bus, truck, baby-taxi and other three wheeler-vehicles, automobiles, motorbikes, trains, airplanes, jetfighters – all create excessive noise. Besides, the hydraulic horns used by buses and trucks, loud-speakers, generators, brick-breaking machines, whistle of trains, sirens of emergency vehicles, lightning, high sound of welding factories, building construction activities and the machines used in any construction works create high level of sound pollution. ^[5] Furthermore, sometimes religious institute play role as a source of noise pollution.



Photo 1: Outdoor source of noise pollution

4.6. Effects on Health

The health-hazards of noise pollution can be categorized into physiological and psychological or mental hazards. The former includes hearing-loss, high blood-pressure, nervous-disorder, headache, lung problems and breathing complications, indigestion, peptic ulcer, backbone curving etc. It also causes heart-attack, stroke and sleep-disorder. The latter includes 9 types of mental diseases. According to the psychiatrists, loud sounds increase emission of adrenal hormone in blood that increases mental impatience and excitement. As a result, various mental disorders including anger, annoyance, aggression, stress, anxiety, frustration, tension and depression occur. It also turns the students apathetic or indifferent towards their studies. ^[5]

V. ANALYSIS

5.1. Street Hawker

Table II: Health effect on Street Hawker

Area	No. of Person	Hearing Impairment	Blood Pressure	Agitation	Task Performance
Commercial	30	22	8	18	17
Residential	30	20	25	27	16
Industrial	30	21	27	17	17
Silent	30	20	18	20	22
Mixed	30	20	14	18	14

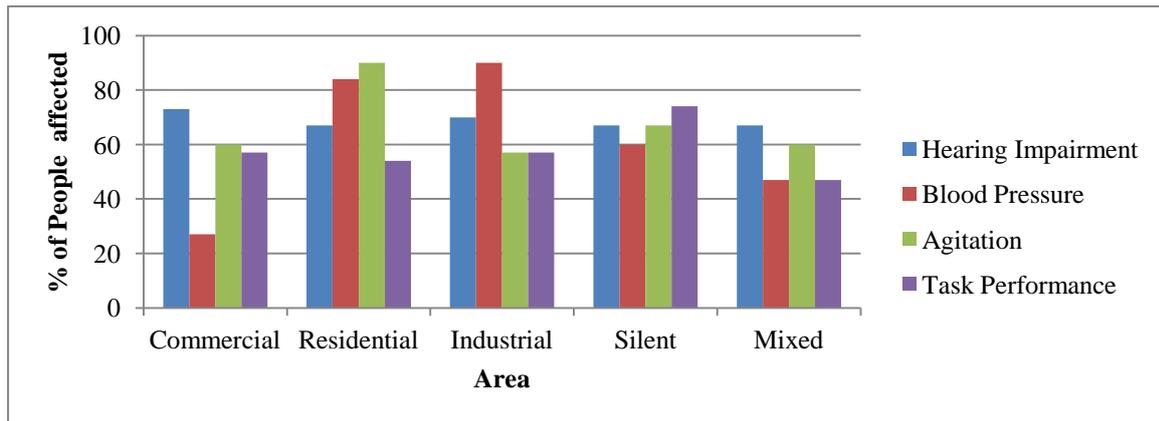


Figure 1: % of street hawkers affected in different selected zones

For street hawkers, noise induced hearing impairment is almost same in all the areas. But when it comes to non-auditory effects like blood pressure, the percentage fluctuated largely. Although only 27% of surveyed hawkers blamed noise for their blood pressure in commercial zones, the rate is exact 90 in term of industrial areas. Another non-auditory effect namely agitation is severe in residential areas, yet other areas have quite similar result. Task performance is greatly hampered for the hawkers in silent zones. The most significant feature of this graph is, at least 60% of surveyed hawkers is suffering from noise induced hazards in silent zones.

5.2. Roadside Shopkeeper

Table III: Health effect on Roadside Shopkeepers

Area	No. of Person	Hearing Impairment	Blood Pressure	Agitation	Task Performance
Commercial	30	23	20	22	24
Residential	30	23	12	15	21
Industrial	30	17	21	17	18
Silent	30	18	16	23	20
Mixed	30	14	17	16	15

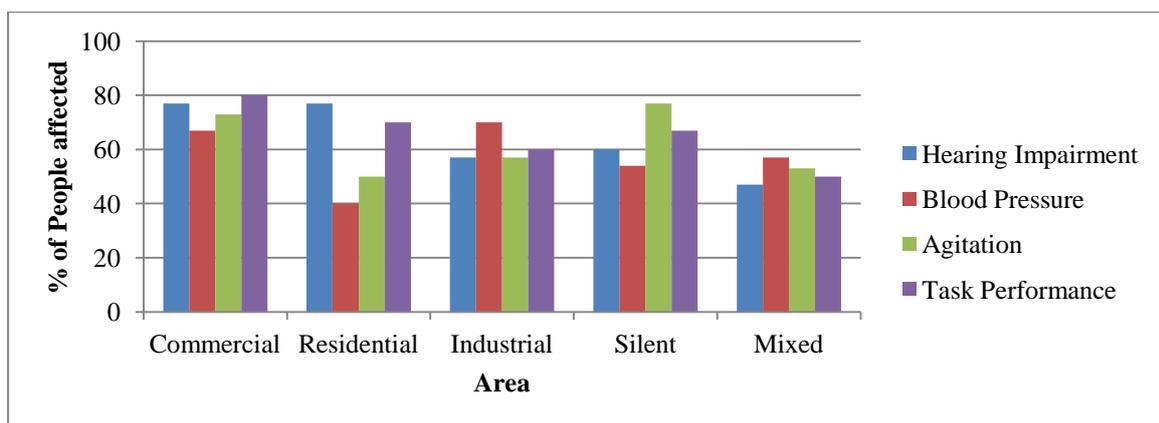


Figure 2: % of roadside shopkeepers affected in different selected zones

For roadside shopkeepers, selected sorts of health hazard is severe in commercial zones. Lackluster performance is the most accused problem among roadside vendors regarding all zones. Auditory effects are at peak in commercial and residential areas. Although blaming blood pressure as a health hazard of noise is at nadir in residential areas, 70% of surveyed vendors from industrial area pointed out this phenomenon as a major hazard to them due to continuous exposure in high noise. Agitation is high at silent zones while in mixed zones, every single health effect is noticeably in quite similar range.

VI. PROPOSAL

6.1. Traffic Control

As vehicle is considered as the main source of noise pollution, not only the commercial or industrial areas but also silent and residential areas. Therefore amount of traffic must be controlled to reduce noise related pollution.

6.2. Relocation of Industry

Industries inside the city not only producing noise pollution but also air pollution and traffic congestion. Hence industry must be relocated at the periphery or outside of the city.

6.3. Prohibit Deteriorating Business Policy

To attract customers, playing CD or DVD at a very high volume or shouting by the name of selling price is a common scenario in streets of commercial places in Dhaka city. Such activities by vendors create pollution thus must be stopped.

6.4. Ban Hydraulic Horn

Although the use of hydraulic horn is restricted inside the city for a certain period of time, especially 6 am to 9 pm. But to reduce noise level further it should be banned for 24 hours.

6.5. Stop Unnecessary Honking

Honking when not necessary is a common practice mostly in commercial and industrial zones. Hence create excess noise. Unnecessary honking must be stopped to mitigate noise pollution.

6.6. Tree Plantation

Planting tree can play a great role by creating natural barrier to noise. Besides, it will keep the air clean. Therefore planting tree on road island should initiate at a large extent.

6.7. Law Enforcement

Certainly existing law to control noise pollution is not adequate, yet their application must be ensured to mitigate the situation in some extent. Government should come forward to reduce noise related hazards by levying various laws and carry them out accordingly.

6.8. Public Awareness

Overall public awareness is the key to reduce noise level and related health hazards in Dhaka city.

VII. CONCLUSION

This paper is dedicated to explore the actual scenario of noise induced health hazards among roadside population in Dhaka, Bangladesh. From analysis it is found that, auditory effect namely hearing impairment is affecting these people mostly. In case of non-auditory effect, people gets muddled up and the fluctuation of graph depicts their lack of knowledge regarding non-auditory effects of noise pollution. Besides, lack of implementing governmental rules also worsening the present condition. Moreover, current noise control rule, 2006 is largely inadequate to mitigate the noise level and its consequent hazards. Further failure of government or responsible authority will proliferate the deteriorating effects of noise. This study provides a strong ground for all responsible to consider non-auditory effects are as important as auditory effect. Therefore the legal legislator should levy rules to protect the health of workers working under such environment and implement the rules strictly alongside enhancing public awareness, in future.

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