



## HEALTH HAZARDS ASSOCIATED WITH NOISE IN URBAN AREA

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**Abstract:** Noise or unwanted sound is an environmental stressor. At the international level studies are based on the auditory and non-auditory effects of aircraft noise mostly. The present survey was conducted among people exposed to loud noise in Kolkata, a metropolitan city in India. The study area includes railway stations of Sealdah and Dum Dum and music shops in Chandni Chowk. The study was conducted among the working class people among whom the adverse health effects may lead to productivity loss with corresponding economic losses. A detailed social survey was carried out to investigate the ill effects of noise on exposed male individuals. The ages of interviewed persons were ranging from 26-35 years (18.3 %), 36- 45 years (26.7% ), 46-55 years (13.3% ), 56-65 years (18.3% ) and 23.3% were below the age of 25 years. The average time of exposure to noise was 68.25 hours per week. Among the sixty persons interviewed the effects were found as moderate to severe fatigue (87% suffered), loss of concentration (81.5% suffered), irritation (81% suffered), headache (80% suffered) and hypertension (76.8%). 74.1% complained of suffering from dizziness, more than 60% reported other psychological discomforts like depression (65.5 %), indecisiveness (64.9 %), withdrawal ((64.9 %) and loss of appetite (64.3 %). 52.7 % faced problems like memory disorder, however, only 41.5 % suffered from lack of sleep or insomnia. Noise pollution is an obvious result of urbanization whereas in the music industry, noise is the desired product. But there is little awareness on chronic exposure to noise, its health impact and management. An extensive survey with awareness generation is necessary to check the health impact of noise in our country.

**Keywords:** Health Effects; Male Workers; Music Shop; Noise, Railway Station.

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## INTRODUCTION

In 1971, a World Health Organization (WHO) working group concluded that noise is a major threat to human well-being (Suter, 1991). Noise pollution is an acute problem in developing countries (Berglund and Lindvall, 1995). The World Health Organisation has published guidelines on occupation and community noise which is based on specific environment concept (WHO, 1993) In India, the occupation noise is governed under the Factory Act, 1948 whereas the ambient noise norms have been notified under the Environment (Protection) Act, 1986. In most of the states in India there is a sound limit of 65 decibel (dB) in the daytime and 55 dB in

night, applicable to the streets. Anyone crossing this limit would be causing noise pollution. Noise pollution continues to grow in extent, frequency, and severity as a result of population growth, urbanization, and technological developments (Goines and Hagler, 2007). For example, within the European Common Market, 65% of the population is exposed to unhealthy levels of transportation noise (Carlos, 1999). In New York City, maximum noise levels were measured as 106 dB on subway platforms and 112 dB inside subway cars (Gershon *et al*, 2006). In 1996, the Federal Environmental Agency in Germany reported that two out of three of its citizens had complained about excessive noise (Bronzaft, 2000). Road traffic causes almost 80 % of the

noise annoyances in Norway (Anonymous 1, 2006)

### **Noise and Human Health**

The effects of noise on human health are manifold. There is scientific evidence linking community noise to health problems (WHO, 2009). The WHO reports that chronic noise-induced annoyance and sleep disturbance can compromise health and health related quality of life (Berglund *et al*, 1999). At the international level studies are going on to find the auditory as well as non-auditory effects of noise. However, most works have been done related to aircraft noise in the cities. In the Los Angeles Airport Study, chronic exposure to aircraft noise was found to be associated with raised systolic and diastolic blood pressure (Cohen *et al*, 1980). A Swedish study found that the prevalence of hypertension was higher among people exposed to aircraft noise levels of at least 55 dB around Arlanda airport, Stockholm (Rosenlund *et al*, 2001). A Study in China indicated that 25% respondents had felt highly annoyed before the aircraft noise reached the standard limit. The annoyance threshold of aircraft noise was 73.7 dB by means of numerical scale, 1.3 dB lower than 75 dB, the standard limit of the second class area according to standard of aircraft noise for environment around airport (Guoqing *et al*, 2012).

### **Effect of Traffic Noise**

Modern roadways (including road, rail, and air) and the products of modern technology produce increasing levels of unwanted noise of varying types and intensities throughout the day and night that disturb sleep, concentration, and other functions (Bluhm *et al*, 2004; Carlos, 1999; Ising and Kruppa, 2004; Lee and Fleming, 2002). More than 20 epidemiological studies have focused on noise-induced health effects in Germany. These studies demonstrate a clear association between residential exposure to traffic noise and cardiovascular outcomes (Maschke, 2011). Research on cardiovascular effects of noise, in Serbia, performed in the last nine years, has shown that urban road-traffic noise might be regarded as a risk factor for hypertension in male adults (Belojevic *et al*, 2011).

The noise from locomotive engines, horns and whistles, and switching and shunting operation in rail yards can impact neighboring communities and railroad workers. For example, rail car retarders can produce a high frequency, high level screech that can reach peak levels of 120 dB at a distance of 100 feet, which translates to levels as high as 138, or 140 dB at the railroad worker's ear. Kanakasabai *et al* (2005) reported that during the arrival or departure of trains at the platform the noise level suddenly increases by 27 dB from the normal level. This sudden increase will have definite effect on the health of the passengers on the platform.

### **Effect of Loud Music**

In the music industry, noise is the desired product rather than a by-product. It is understandable that music venues feel the need to create high sound levels to satisfy audience requirements (Barlow and Castilla-Sanchez, 2012). Survey of Barlow and Castilla-Sanchez among workers in music venues revealed that over 85% of subjects questioned had experienced symptoms identified as "tinnitus" which is manifested by hearing ringing noises in the ears and 50% had experienced reduction in hearing level or muffled hearing at some point, with more than 75% of these reporting that this had occurred during or after a work shift.

The effects of noise on human health are not very prominent or instant. People accept noise slowly and cannot even realize its physiological as well as psychological effects. Noise pollution contributes to several health hazards and may ultimately end into permanent hearing loss. The most immediate effect of noise pollution is a deterioration of mental health. Such irritability will lead to productivity loss in the workplaces. Though some effects of noise pollution are known already, not much is done to generate awareness among the common and even less is done to minimize noise pollution. The proposed research is intended to observe the slow and silent effects of noise caused due to day to day activities of the urban population of Kolkata and Dumdum. It has special reference to noise at workplace i.e. occupational noise.

## **EXPERIMENTAL**

Though noise in our country is not considered to be an important issue, it adversely affects general health and well-being in the same way as does chronic stress. Not many conclusive work or references are found on the effect of noise among people in India. The present work was performed with the objective to investigate the ill effects of noise on exposed male individuals, specially the non-auditory effects of noise. Though the vulnerable groups include patients with various diseases, patients in hospitals or those who are rehabilitating from injury or disease, infants and young children, and the elderly, the study was conducted among the working class people among which the deleterious health effects may lead to productivity loss and corresponding economic losses.

**The Venue:** This study assessed three public venues:

**Sealdah railway station:** Sealdah railway station is a major station in Kolkata including three railway terminals namely Sealdah Main, Sealdah North and Sealdah South. It is one of the busiest railway stations in India. The coordinates are 22°34'03"N 88°22'15"E/ 22.5674°N 88.3708° E (Anonymous 2).

**Dum Dum railway station:** Dum Dum is located at 22°37'16"N 88°23'34" E/ 22.62111°N 88.39278°E (Anonymous 3). Dum Dum Junction is an important railway station in Kolkata suburban railway connections. The railway station at Dum Dum and the metro station are in the same complex. The circular railway also terminates at the same station. From Sealdah railway station to Dum Dum station the distance is 7 Km (Anonymous 4).

**Music shops of Chandni Chowk area:** Chandni Chowk is a busy commercial place in Kolkata. It is located off Dharmatala Street near Esplanade in Central Kolkata. It is one of the main markets for electronics components.

**Methodology:** Questionnaires were used to determine work patterns, health problems and levels of exposure to noise. The study was made using a three point structured questionnaire, and also by semi structured interviews with the exposed men. The men surveyed at the two railway stations were mainly shop keepers and porters by profession, persons exposed to loud

noise for a much longer period of time than the regular passengers of rail who get comparatively quiet environment at work places. At the same time the sales person and other workers at the music shops were exposed to loud noise throughout their working period.

**Limitations:** Though the working class people exposed to noise include men and women equally in an urban perspective, only the male exposed persons were interviewed for certain practical suitability.

## RESULTS AND DISCUSSION

Among the 60 persons interviewed, people were found to be in various age groups showing that the average working class people in a metropolitan city like Kolkata include a large section of men ranging from a tender age of fourteen to an old person of sixty five years (Table 1).

Average time of exposure/ day was found to be 10.5 hours, which is quite long. Average days exposed/ week was 6.5 days, this is really astonishing and alarming at the same time as the porters and shopkeepers have almost seven days working schedule every week. Therefore, Average hours exposed/ week is calculated as 68.25 hours/week. The results showing the health effects are tabulated in Table 2 and 3.

**Table 1. Age groups of interviewed persons**

Age group	% among total interviewed persons
< 25 years	23.3
26-35 years	18.3
36-45 years	26.7
46-55 years	13.3
56-65 years	18.3

**Table 2. Percentage of ailments among the interviewed persons**

Name of the ailment	% of no suffering	% of moderate suffering	% of severe suffering
Headache	20.0	50.0	30.0
Dizziness	25.9	59.26	14.8
Fatigue	12.5	51.79	35.7
Memory disorder	47.3	40.0	12.7
Loss of concentration	18.5	38.9	42.6

Irritation	18.9	46.6	34.5
Withdrawal	35.1	52.6	12.3
Depression	34.5	40.0	25.5
Indecisiveness	35.1	57.9	7.0
Insomnia	58.5	28.3	13.2
Loss of appetite	35.7	39.3	25.0
Hypertension	23.2	57.1	19.6

**Table 3. Percentage of health impairments among the interviewed persons**

Type of health impairments	% of suffering
Loss of weight	59.60
Diabetes	18.33
Cardiac problem	16.67

Among the interviewed persons the effects were found to be alarming. The results show that the most dominant problems were moderate to severe fatigue (87% suffered), loss of concentration (81.5% suffered), irritation (81% suffered), headache (80% suffered) and hypertension (76.8%). 74.1% complained of suffering from dizziness, more than 60% reported other psychological discomforts like depression (65.5 %), indecisiveness (64.9 %), withdrawal ((64.9 %) and loss of appetite (64.3 %). 52.7 % faced problems like memory disorder. However, only 41.5 % suffered from lack of sleep or insomnia may be because the duration of exposure to noise was during the daytime and not at night. People suffering from major health impairments like diabetes, cardiac problem and loss of weight were less. However, the latter health problems may be associated with other reasons like stressful lifestyle, malnutrition etc. apart from exposure to loud noise.

## CONCLUSION

Noise is one of the major causes of stress in towns, activating the mechanisms of stress reactions in the organism. Despite the fact that much has been written about the health effects of noise, it seems that much of the alarming information is not appreciated by the medical community and even less so by the general public. In 1990, a National Institute of Health (NIH) panel concluded that high visibility media campaigns are needed to develop public awareness of the effects of noise on hearing and the means of self protection. The WHO recommends that unprotected exposure to sound

levels greater than 100 dB (for example, the sound of a jackhammer) should be limited in duration (4 hr) and frequency (4 times/yr). Beyond the obvious danger to hearing from chronic noise pollution at work, healthcare practitioner, workers, employers and insurers should understand that noise at levels below what can cause ear damage can produce physical and psychological stress which, in turn, can contribute to many other health problems. But there is little awareness on high exposure to noise and its health impact. The Central Pollution Control Board (CPCB) had carried out a study in March 2012 for assessment of ambient air quality at 14 major stations over 12 zones of Indian Railways including Sealdah where the present study was also conducted. Noise levels were in excess of the prescribed limit at all stations and there was no system of monitoring the noise level. Even the pollution control board in the state conducts noise monitoring programme on festive days only. Elements of the music industry ignore their legal responsibility to protect staff from high noise levels, despite high profile campaigns to inform and educate the industry. Barlow and Castilla-Sanchez (2012) by their survey in music venues observe that despite 61% of the staff reporting having had training, few employees were aware of the provision of hearing protection in their workplace. Therefore, the utility of the present study is to reveal the detrimental effects of noise on people in the city with a view to generate consciousness and protect innocent victims from psychological, mental and physical disturbances.

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