

Community Noise Pollution in Urban India: A Social Health Concern

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ABSTRACT

The noise impact on people's quality of life goes beyond annoyance, and may affect somatic and psychic aspects of health. Environmental economics is the theoretical framework supporting instruments designed to evaluate the impact of noise on peoples' quality of life. The modern civilization creates more and more noise, because of the development of Industries, machinery and Technology. It has been reported that noise can become a health hazard causing deafness which includes temporary or permanent hearing loss. Noise is an increasingly omnipresent, yet underestimated, form of pollution. Long periods of exposure to relatively low levels of noise can have adverse effects on human health, such as raised blood pressure, hypertension, disrupted sleep and cognitive development in children, diminished working memory span, and psychiatric disorders. Noise is one of the major local disturbances associated with road traffic. Despite its major importance in the urban environment, the problem of noise has received little attention from environmental economists.

Keywords: community noise, health impacts, noise, road traffic, society

INTRODUCTION

The noise impact on people's quality of life goes beyond annoyance, and may cause somatic and psychic disorders. Environmental economics is the theoretical framework supporting instruments designed to evaluate the impact of noise on peoples' quality of life. It has been reported that noise can become a health hazard causing deafness which includes temporary or permanent hearing loss. Noise is one of the major local disturbances associated with road traffic. Excessive exposure to relatively low levels of noise can have negative impacts on human health, such as raised blood pressure, hypertension, disrupted sleep and cognitive development in children, diminished working memory span, and psychiatric disorders.

Environment pollution is increasing all through the globe and India is not free from this poisonous disease. This is the gift of modern living, industrialization and urbanization.

The decadal growth of the urban population in India rose to 31.8% during the last decade (2001-2011). Rapid urbanization has led to various public health challenges, including environmental pollution. Most activities that cause pollution are essential to meet the needs of the growing population and development. Therefore preventive measures to minimize pollutants are more practical than their elimination. Noise is regarded as a pollutant under the air (Prevention and Control of Pollution) Act, 1981. It has been defined as unwanted sound. Noise is an underrated threat that can cause a number of short- and long-term health problems. It is increasingly becoming a potential hazard to health, physically and psychologically, and affects the general well-being of an individual. Excessive noise interferes with people's daily activities at school, at work, at home, and during leisure time. It can cause sleeping disorders due to cardiovascular and psycho physiological effects reduce performance and promote annoyance responses and changes in social behaviour. Noise, which continues to be one of the main environmental problems facing India, is gaining its importance as a result of the rise in noise levels that comes about with increasing economic activity. Excessive levels of noise have both physiological and psychological consequences. The physiological effects include, for example, hearing impairment, disturbed sleep, high blood pressure etc.

Environmental noise is one of the most common pollutants of the environment. 'Environmental noise includes the primary sources of road, rail and air traffic, industries, construction and public works and the neighbourhood' (WHO, 1999). The main indoor noise sources are ventilation systems, office machines, home appliances and neighbours.' Environmental noise is increasingly becoming a community concern both nationally and internationally. Considerable efforts have been made over about the last four decades to reduce noise impacts from transportation sources such as road and rail traffic and aircraft. **(Passchier-Vermeer and Passchier, 2000)**. At the same time increases in urban population have resulted in greater

exposure of a larger percentage of the population to the increased noise levels (Stansfeld et al., 2005; Vallet al., 2002)

With urbanization of our cities and towns, there has been a rapid increase in the traffic noise on the roadways. Although transportation is an important part of the today's society, its benefits may be not that important as its negativities and is a cause for concern for the community. Noise pollution from road traffic is one such negative impact. During the past decade, the understanding that it is an increasingly serious risk has gained ever wider recognition, mostly due to the fact that noise is a very complex phenomenon not only in its physical aspect but also in its psychological and medical dimensions. The extent of the environmental noise situation has also been highlighted by the World Health Organization, with identifying the fact that impacts such as community annoyance, dissatisfaction, interference with communication, sleep disturbance, impaired task performance, auditory, physiological, and other health issues have resulted from this (Ferreira, S., Moro, M., 2010). Noise also has significant impact on the quality of life. Such impacts are seldom catastrophic and are often only transitory, but adverse effects can be cumulative with prolonged, continuous, or repeated exposure. Consequently, it is practically indispensable to monitor, predict, and analyze noise and evaluate the exposure-effect mechanism of it. During the last century, substantial research has been conducted to study road traffic noise exposure and human response, annoyance, discomfort, and sleep disruption (WHO, 2011). Most part of them have used the monitoring, modelling, and/or other assessment methodologies including the socioacoustical surveys and sleep disturbance studies in laboratory and field types. (Carter, 1996)

Several studies have been conducted in various parts of the country to assess the ambient noise level. Majority of the total environmental noise is caused by motor vehicles. Day time noise levels measured along roads between two campuses of a University in Balasore, Orissa, ranged from 70.1 dB(A) to 120.4 dB(A) which are above the permissible limits for road traffic noise (70 dB[A]). Noise generated by different vehicles was also measured. None of the vehicles emitted within the permissible limits for road traffic noise. Vehicular air horns emitting loud noise and their misuse have been reported to be the major contributor to high noise levels. In a study which measured noise levels in the four zones as categorized by the Central Pollution Control Board, the highest average day-time noise level was detected in silence zones (73.53 dB[A]), i.e., not less than 100 m around hospitals, educational institutions, court, and religious places; and lowest in Residential areas (63.5 dB[A]). The highest average noise level for night time was in traffic intersection areas (71.18 dB[A]) and lowest in the industrial areas.

Increasing population, transportation demands, vehicular increase, and congestion of roads are factors that have intensified traffic noise pollution significantly in recent years. Studies assessing noise levels in different settings, week day and holidays, and different zones observed that average noise levels were above the permissible standards. Another convenient mode of transport in urban areas, the metro trains, were found to generate noise levels, above the permissible levels of 65 dBA (day) and 55 dBA (night) (commercial zone). Although the ambient noise level is reduced due to its predominant underground location, workers are at higher risk, particularly those stationed at the high noise level areas (engine noise, electric generator etc.).

HEALTH CONSEQUENCES OF COMMUNITY NOISE POLLUTION

The adverse health effects of noise are auditory disorders such as hearing impairment, tinnitus, ear ache, noise-induced hearing loss, and non-auditory manifestations which include headache, psychological disturbances manifested by irritability, inability to concentrate on one's work thereby reducing work efficiency, disturbance in sleep and rest, and interference with speech communication.

Hearing impairment has been defined as an increase in the threshold of hearing. The affected person is unable to understand speech in day-to-day life. Noise-induced hearing impairment mainly occurs in the frequency range of 3,000-6,000 Hz, and with increased exposure, at lower frequencies. Speech intelligibility can be reduced even at 10 dB, averaged over 2,000-4,000 Hz, over both ears. Above 30 dB hearing impairment (averaged over 2,000-4,000 Hz, over both ears), a social hearing handicap is noticeable. Significant hearing impairment occurs on exposure to prolonged exposure to noise levels of 70-85 dB.

Noise-induced hearing loss has been scientifically established as an adverse health effect of noise. In temporary hearing loss, the hearing threshold is elevated temporarily, known as temporary threshold shift.

With chronic exposure, permanent threshold shift occurs. In this case, hearing loss becomes permanent due to irreversible damage to the sensory cells of the cochlea. Noise-induced hearing loss usually first affects the hearing threshold at high frequencies above the range of speech perception at around 4 kHz.

A study among workers exposed to road traffic noise in Brazil reported that 28.5% had suspected noise-induced hearing loss on audiometric assessment. Those working in noisier areas were more affected (38.8%) than those in areas with lower noise levels (24.2%). Noise-induced hearing loss was estimated among automobile drivers, traffic police, road side hawkers, shop keepers, and garment workers in Bangladesh. More than two-thirds of the participants were unaware of their hearing impairment and 78% had poor knowledge about the adverse effects of noise on health.^[25] Tinnitus and hearing loss were reported by traffic policemen, in a study conducted in Bangladesh. Hearing loss was associated with the duration of exposure. With exposure time of 6-10 years, 20% had mild sensory-neural hearing loss and those exposed for 11-20 years, 28% had mild to moderate sensory-neural hearing loss. Noise-induced hearing loss was also detected on audiometric tests among traffic personnel in Malaysia. Auditory morbidity is a serious issue which should not be neglected. It can lead to miscommunication, accidents, loss of livelihood, etc. It can be prevented or greatly reduced by periodic audiometric check-ups, ear protection, and awareness training.

Studies have also reported hypertension to be associated with noise exposure. A study conducted in Pakistan showed that workers exposed to high noise levels were more likely to be hypertensive (Odds ratio: 4.41, confidence interval: 2.123-9.196), and at risk for pre-hypertension (Odds ratio: 3.809; confidence interval: 1.804-8.042) when compared with those working at normal sound levels. Another study observed that residential proximity to high traffic and traffic noise predisposed to higher blood pressure and hypertension. A study conducted in Denmark observed increase in systolic blood pressure per 10 dB(A) increase in 1 year mean road traffic noise levels. Other cardiovascular manifestations with noise exposure have also been studied. A study conducted in Stockholm observed that myocardial infarction was associated with long-term road traffic noise exposure of 50 dBA or higher (adjusted odds ratio = 1.12, 95% confidence interval = 0.95-1.33). The associations have been found to be weak although long-term exposure to LAeq, 24 h values of 65-75 dB are associated with cardiovascular disease, being stronger for ischemic heart disease than hypertension. However, such findings are important as increasing number of people are exposed to such noise levels.

RECOMMENDATIONS

Preventive and control measures have been recommended, viz., stringent implementation of legislation, efficient engineering products, proper planning of roadways, considering their proximity to human settlements. In industry setting, personal protective equipment such as ear muffs and ear plugs are required. Good practices to prevent noise-induced ailments in children should be adopted. Noise attenuation by placing vegetations around buildings has also been recommended. Recommendations of the Delhi Pollution Control Committee include ban on pressure horns, phasing out of three wheeler autos, extensive plantation of trees on the roadsides, encouraging use of noise-absorbent materials, adequate noise barriers around silence zones, monitoring of loudspeaker, and generator sets to ensure compliance with prescribed rules.

Above all, awareness of the public and stakeholders is the key component in the prevention and control of community noise pollution. Basic and essential information should be extensively disseminated, such as noise levels created by common sources of noise pollution, adverse health effects on both the person creating noise, and the public preventive measures and conditions punishable under law. Graphic displays in public places are a good medium to spread the message. School campaigns, health education programs, and publicizing through print and electronic media can actively address this issue. Involvement of non-governmental organizations in generating public interest and co-operation, and providing audiological facilities will immensely help the cause.

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