Journal of The Gujarat Research Society

ISSN: 0374-8588
Volume 22 Issue 1, January 2020

NOISE POLLUTION AND HUMAN HEALTH

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Abstract

Noise pollution is a major problem in cities around the world. Noise is defined as unwanted sound. Environmental noise consists of all the unwanted sounds in our communities except that which originates in the workplace. Environmental noise pollution, a form of air pollution, is a threat to health and well-being. It is more severe and widespread than ever before, and it will continue to increase in magnitude and severity because of population growth, urbanization, and the associated growth in the use of increasingly powerful, varied, and highly mobile sources of noise. It will also continue to grow because of sustained growth in highway, rail, and air traffic, which remain major sources of environmental noise. In factory workplace workers are exposed to high noise due to machinery in routine. The potential health effects of noise pollution are numerous, pervasive, persistent, medically and socially significant. Noise produces direct and cumulative adverse effects that impair health and that degrade residential, social and working environments with corresponding real (economic) and intangible (well-being) losses.

Keywords: *Continual Noise, Environmental Noise, Human Health, Noise Pollution, World Health Organization (WHO)*

I. INTRODUCTION

Florence Nightingale diagnosed noise as a health danger in 1859 while she wrote: “useless noise is the cruelest abuse of care which may be inflicted on both the ill or the sick”. Noise pollution; a city territorial phenomenon is assuming critical proportions in every city. The frequency and intensity of pollution have been growing day by day. Noise pollution is an annoyance to people [1]. The noise is commonly machine-created sound that disrupts the hobby or balance of a human's manner of life. it is a growing environmental hassle that is more and more becoming an omnipresent, but left out form of pollutant now not best in developed nations but additionally in the developing international locations. The phrase noise

is derived from Latin phrase ‘‘Nausea’’ implying ‘‘unwanted sound’’ or sound that is loud, unpleasant or surprising. it is able to be defined as incorrect sound, within the wrong vicinity and at the wrong time [2].

The noise troubles of the beyond faded in importance while in comparison with those skilled by way of modern-day city dwellers; noise pollutants continue to grow in volume, frequency, and severity due to population boom, urbanization, and technological trends. Because of publicity of noise human beings are stricken by distinction forms of diseases like hearing Impairment, Interference with spoken communique, Sleep disturbances, cardiovascular disturbances, Annoyance and so on. The WHO has documented seven categories of adverse health effects of noise pollution on humans. Much of the following comes from the WHO Guideline on Community Noise and follows its format [3].

The guideline provides an excellent, reasonably up-to-date, and comprehensive overview of noise-related issues, as do the other recent reviews on this subject. Hearing is essential for well-being and safety. Hearing impairment is typically defined as an increase in the threshold of hearing as clinically assessed by audiometry [4]. Impaired hearing may come from the workplace, from the community, 2 and from a variety of other causes (eg, trauma, ototoxic drugs, infection, and heredity). There is general agreement that exposure to sound levels less than 70 dB does not produce hearing damage, regardless of the duration of exposure. There is also general agreement that exposure for more than 8 hours to sound levels in excess of 85 dB is potentially hazardous; to place this in context, 85 dB is roughly equivalent to the noise of heavy truck traffic on a busy road. With sound levels above 85 dB, damage is related to sound pressure (measured in dB) and to time of exposure [5].

The major cause of hearing loss is occupational exposure, although other sources of noise, particularly recreational noise, may produce significant deficits. Studies suggest that children seem to be more vulnerable than adults to noise induced hearing impairment. Noise induced hearing impairment may be accompanied by abnormal loudness perception (loudness recruitment), distortion (paracusis), and tinnitus. Tinnitus may be temporary or may become permanent after prolonged exposure. The eventual results of hearing losses are loneliness, depression, impaired speech discrimination, impaired school and job performance, limited job opportunities, and a sense of isolation.

II. DISCUSSION

Health effects of environmental noise pollution:

It might be tempting to think that noise isn’t a serious health issue, after all, it’s just noise. It won’t kill us right? Well, maybe. Exposure to prolonged or excessive noise has been shown to cause a range of health problems ranging from stress, poor concentration, productivity losses in the workplace, and communication difficulties and fatigue from lack of sleep, to more serious issues such as cardiovascular disease, cognitive impairment, tinnitus and hearing loss. In 2011 the World Health Organization (WHO) released a report titled ‘Burden of disease from environmental noise’. This study collated data from various large-scale epidemiological studies of environmental noise in Western Europe, collected over a 10-year period [6]. The studies analyzed environmental noise from planes, trains and vehicles, as well

as other city sources, and then looked at links to health conditions such as cardiovascular disease, sleep disturbance, tinnitus, cognitive impairment in children, and annoyance. The WHO team used the information to calculate the disability-adjusted life-years or DALYs—basically the healthy years of life—lost to 'unwanted' human-induced dissonance. Their results might surprise you. They found that at least one million healthy years of life are lost each year in Europe alone due to noise pollution (and this figure does not include noise from industrial workplaces) [7].

The authors concluded that 'there is overwhelming evidence that exposure to environmental noise has adverse effects on the health of the population' and ranked traffic noise second among environmental threats to public health (the first being air pollution). The authors also noted that while other forms of pollution are decreasing, noise pollution is increasing. Interestingly, it may be the sounds we aren't even aware we're hearing that are affecting us the most, in particular, those we 'hear' when we're asleep. The human ear is extremely sensitive, and it never rests. So even when you sleep your ears are working, picking up and transmitting sounds that are filtered and interpreted by different parts of the brain. It's a permanently open auditory channel. So, although you may not be aware of it, background noises of traffic, aircraft or music coming from a neighbor are still being processed, and your body is reacting to them in different ways via the nerves that travel to all parts of the body and the hormones released by the brain. The most obvious is interrupted sleep, with its flow-on effects of tiredness, impaired memory and creativity, impaired judgement and weakened psychomotor skills. Research has shown that people living near airports or busy roads have a higher incidence of headaches, take more sleeping pills and sedatives, are more prone to minor accidents, and are more likely to seek psychiatric treatment. But there is another, more serious outcome. Even if you don't wake up, it appears that continual noise sets off the body's acute stress response, which raises blood pressure and heart rate, potentially mobilizing a state of hyper arousal. It is this response that can lead to cardiovascular disease and other health issues [8].

Continual noise sets off the body's acute stress response:

A study undertaken by Dr Orfeu Buxton, a sleep expert at Harvard University, monitored the brain activity of healthy volunteers, who played 10-second sound clips of different types of noise as they slept. The brainwaves of volunteers were found to spike in jagged, wake-like patterns of neural activity when each clip was played. This particular study was focusing on noises heard in a hospital environment—including talking, phones ringing, doors closing, machinery, toilets flushing, and city traffic, among others—but many of the sounds tested are ones we would also hear in an urban environment. Sound is an important and valuable part of everyday life. But when sound becomes noise, it can negatively affect our mental and physical health. The realities of modern life mean the noises created in our world are not going to suddenly fall silent. Instead, we need to recognize that noise pollution is a serious health concern worthy of our attention, and find realistic and sustainable ways to manage and reduce it—starting with banning those rubbish truck pickups in the middle of the night!

Health Effects from Noise:

Noise health effects are the physical and psychological health consequences of regular exposure to consistent elevated sound levels. Noise from traffic, in particular, is considered by the World Health Organization to be one of the worst environmental stressors for humans, second only to air pollution. Elevated workplace or environmental noise can cause hearing impairment, tinnitus, hypertension, ischemic heart disease, annoyance, and disturbance. Changes in the immune system and birth defects have been also attributed to noise exposure. Although age-related health effects (presbycusis) occur naturally with age, in many countries the cumulative impact of noise is sufficient to impair the hearing of a large fraction of the population over the course of a lifetime [9].

Noise exposure has been known to induce noise-induced hearing loss, tinnitus, hypertension, vasoconstriction, and other cardiovascular adverse effects. Chronic noise exposure has been associated with sleep disturbances and increased incidence of diabetes. Adverse cardiovascular effects occur from chronic exposure to noise due to the sympathetic nervous system's inability to habituate. The sympathetic nervous system maintains lighter stages of sleep when the body is exposed to noise, which does not allow blood pressure to follow the normal rise and fall cycle of an undisturbed circadian rhythm. Stress from time spent around elevated noise levels has been linked with increased workplace accident rates and aggression and other antisocial behaviors. The most significant sources are vehicles, aircraft, prolonged exposure to loud music, and industrial noise.

Noise pollution, also known as environmental noise or sound pollution, is the propagation of noise with ranging impacts on the activity of human or animal life, most of them harmful to a degree. The source of outdoor noise worldwide is mainly caused by machines, transport, and propagation systems. Poor urban planning may give rise to noise disintegration or pollution, side-by-side industrial and residential buildings can result in noise pollution in the residential areas. Some of the main sources of noise in residential areas include loud music, transportation (traffic, rail, airplanes, etc.), lawn care maintenance, construction, electrical generators, explosions, and people. Documented problems associated with noise in urban environments go back as far as ancient Rome. Today, the average noise level of 98 decibels (dB) exceeds the WHO value of 50 dB allowed for residential areas. Research suggests that noise pollution is the highest in low-income and racial minority neighborhoods, and noise pollution associated with household electricity generators is an emerging environmental degradation in many developing nations [10].

High noise levels can contribute to cardiovascular effects in humans and an increased incidence of coronary artery disease. In animals, noise can increase the risk of death by altering predator or prey detection and avoidance, interfere with reproduction and navigation, and contribute to permanent hearing loss. A substantial amount of the noise that humans produce occurs in the ocean. Up until recently, most research on noise impacts has been focused on marine mammals, and to a lesser degree, fish. In the past few years, scientists have shifted to conducting studies on invertebrates and their responses to anthropogenic sounds in the marine environment. This research is essential, especially considering that invertebrates make up 75% of marine species, and thus compose a large percentage of ocean

food webs. Of the studies that have been conducted, a sizable variety in families of invertebrates have been represented in the research. A variation in the complexity of their sensory systems exists, which allows scientists to study a range of characteristics and develop a better understanding of anthropogenic noise impacts on living organisms

III. CONCLUSION

The ultimate goal should be to identify ways to improve the acoustic environment, but generally only rudimentary measures (dBA) have been reported. These acoustic metrics may be overly simplistic for hospital environments. Additionally, a number of "mechanism" studies evaluating changes in the acoustic environment are needed in order to optimize the effectiveness of acoustic or behavioral alterations. We should prevent exposure to noise in the working environment to save our precious lives.

IV. REFERENCES

[1] N. A. B. Mabahwi, O. L. H. Leh, and D. Omar, "Human Health and Wellbeing: Human Health Effect of Air Pollution," Procedia - Soc. Behav. Sci., 2014, doi: 10.1016/j.sbspro.2014.10.056.

[2] C. D. Francis, N. J. Kleist, C. P. Ortega, and A. Cruz, "Noise pollution alters ecological services: Enhanced pollination and disrupted seed dispersal," Proc. R. Soc. B Biol. Sci., 2012, doi: 10.1098/rspb.2012.0230.

[3] N. Singh and S. C. Davar, "Noise Pollution-Sources, Effects and Control," J. Hum. Ecol., 2004, doi: 10.1080/09709274.2004.11905735.

[4] A. Dzhambov and D. Dimitrova, "Urban green spaces′ effectiveness as a psychological buffer for the negative health impact of noise pollution: A systematic review," Noise and Health. 2014, doi: 10.4103/1463-1741.134916.

[5] C. D. Francis, C. P. Ortega, and A. Cruz, "Noise Pollution Changes Avian Communities and Species Interactions," Curr. Biol., 2009, doi: 10.1016/j.cub.2009.06.052.

[6] D. B. Rowe, "Green roofs as a means of pollution abatement," Environ. Pollut., 2011, doi: 10.1016/j.envpol.2010.10.029.

[7] C. L. J. Frid and B. A. Caswell, Marine pollution. 2017.

[8] K. H. Kim, E. Kabir, and S. Kabir, "A review on the human health impact of airborne particulate matter," Environment International. 2015, doi: 10.1016/j.envint.2014.10.005.

[9] L. Van Cauwenberghe and C. R. Janssen, "Microplastics in bivalves cultured for human consumption," Environ. Pollut., 2014, doi: 10.1016/j.envpol.2014.06.010.

[10] A. Haines, R. S. Kovats, D. Campbell-Lendrum, and C. Corvalan, "Climate change and human health: Impacts, vulnerability and public health," Public Health, 2006, doi: 10.1016/j.puhe.2006.01.002.