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"Noise Pollution, Effect of Noise on Behaviour of Animals and Human Health"

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Abstract: The paper deals with findings in animal's response to noise. Noise pollution is a major problem in cities around the world. The noise from different normal and additionally manmade sources, particularly movement. Truth be told, commotion has come to be related with the physiological, physical, passionate and mental prosperity of an individual, but it people or even creatures. Factors including species, gender, age, and length of exposure on metabolism performance, health, reproduction, and behavior are discussed. Noise is defined as unwanted sounds in our communities except that which originates in the workplace. Effects of continuous and sudden noise on animals are also presented in detail. More physiological and behavioral responses have been described as increased hormonal production, increased heart rate, and reduction in production. Animal species exhibits a wide variety of responses to noise. Some animal species are more sensitive than others, because they may exhibit different forms or strengths of responses. Noise produces direct and cumulative adverse effects that impair health and that degrade residential, social and working environment with corresponding real (economic) and intangible (well–being) losses. Noise represents an important public health problem that can lead to hearing loss, sleep disruption, cardiovascular disease, social handicaps, reduced productivity, negative social behavior, annoyance reaction, absenteeism and accidents. Noise adversely affects general health and well-being in the same way as does chronic stress.

Keywords: Cardiovascular disease; hearing loss, annoyance

Introduction

Noise is physical form of pollution. It is not harmful to air, soil and water but affects the animals including humans. Noise is unwanted sound, that is unpleasant, loud and disruptive. Humans have a hearing range called as audible arrange. Audible range depends upon frequency and loudness of sound. For a person with normal hearing, frequency ranges from 20 t0 20,000 Hz and loudness ranges from 0 to 120 dB. Sound is measured in decibels (dB). A decibel value above 80 is considered to be noise pollution. As said by WHO, hearing impairment is none of the major impacts that happen because of excessive noise. Other than that, stress and anxiety are other harmful effects caused by noise. After prolonged exposure to it, people can suffer from cardiovascular disease and hypertension. Noise pollution, an urban territorial phenomenon is assuming serious proportions in every city.

The frequency and intensity of pollution has been increasing day by day. Noise pollution is an annoyance to human beings. The noise is usually machine-created sound that disrupts activity or balance of human's way of life. It is a growing environmental problem that is increasingly becoming an omnipresent, yet unnoticed form of pollution not only in developed countries but also in the developing countries. The word noise is derived from Latin word "Nausea" implying "unwanted sound" or sound that is loud, unpleasant or unexpected. It can be defined as wrong sound, in the wrong place and at the wrong time. In current animal husbandry noise has become an increasingly great but little noticed problem. Noise produced in intensive animal housing by ventilation system, feeding and excrement removal lines and by animals themselves is a potential stressor and affects not only animals but also tending personnel. The purpose of the current study

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was to determine effects of noise on animals. The noise problems of the past pale in significance when compared with those experienced by modern city dwellers; noise pollution continues to grow in extent, frequency, and severity as a result of population growth, urbanization, and technological developments. Due to exposure of noise people are suffering from different kind of diseases like Hearing Impairment, Interference with spoken communication, Sleep disturbances, cardiovascular disturbances, Annoyance etc. The World Health Organization (WHO) and the U.S. Environmental Protection Agency (EPA) recognize the harmful health effects of noise pollution. According to the Centers for Disease Control and Prevention, noise pollution is "an increasing public health problem" that can lead to a variety of adverse health effects, including hearing loss, stress , high blood pressure, interference with speech, headaches, disturbance of rest and sleep, productivity and mental health effects, and a general reduction of one's quality of life.

2. Adverse Health Effects of Noise

The WHO has documented seven categories of adverse health effects of noise pollution on humans. Much of the following comes from the WHO Guidelines on community Noise and follows its format. The guideline provides an excellent, reasonably up-to-date, and comprehensive overview of noise-related issues.

2.1 Hearing Impairment and Sensitivity to Noise

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. Impaired hearing may come from the workplace, from the community, and from a virety of other causes (eg. Trauma, ototoxic drugs, infection, and heredity). There is general agreement the exposure to sound levels less the 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 the busy road. With sound levels above 85 dB, damage is related to sound pressure (measured in dB) and to time of exposure. 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. Noise is described as unwanted sound, either chronic or intermittent, and can be described in terms including its frequency, intensity, frequency spectrum, and shape of sound pressure through time (Burn, 2008). Decibel (dB) is the unit for measuring the intensity of sound.

It is equal to ten times the logarithm to the base ten of the ratio of the intensity of the sound to be measured to the intensity level of sounds of some reference sound, usually the lowest audible not of the same frequency (B=log 10(P 1/P 2), where B=Bel, and P 1 and P 2 are power levels. 1 Bel is equal to 10 decibels). Frequency means the number of vibrations per second of the air in which the sound is propagation and it is measured in Hertz (Hz) Berglung et al., 1999).

How animals perceive noise? The effect of noise on the central nervous system is dependent on the state of the brain. In an exhausted individual the compensatory mechanisms are more vulnerable than in a rested individual. Intense noise exposure can damage the cochlea and inner ear and lead to a cascade of auditory effects along the entire central auditory cascade.

Susceptibility to noise hearing is species dependent, and it has been shown to the genetically determined (Henry, 1992; Lanier et al., 2000). Animals have a different spectrum of audible sounds with maximum sensitivity at frequencies that are inaudible to humans (Voipio, 1997).

The sensitivity of cattle, sheep and pigs to sound, and the level to which they are exposed, has been reviewed by more authors.

Pigs' hearing range is similar to that of humans, but with a shift toward ultrasound (Kittawornrat and Zimmerman, 2011). The auditory range of pigs is between 55 Hz and 40 kHz and their sense of hearing is more sensitive in the range 500 Hz to 16 kHz, particularly acute around 8 kHz (Heffner and Heffner, 1993).

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The frequency range for reasonable detection varies between 42 Hz and 40.5 kHz, with a region of best sensitivity from 250 Hz to 16 kHz (Hefner, 1998).

Animals not only have to accept the noise, but they also emit (Manteuffel et al., 2004; Brumm et al., 2009). Rodents not only produce sounds that we can hear, but also produce and hear frequencies that are inaudible to humans (above 20 kHz), perceiving sounds up to 80 kHz stimulus (Castelhano-carlos and Baumans, 2009).

2.2 Negative social behaviour and Annoyance

Annoyance is defined as a feeling of displeasure associated with any agent or condition believed by an individual to adversely affect him or her. It has been stated in literature that excessive noise has an influence on behaviour and coordination. Perhaps a better description of this response would be aversion or distress. Noise has been used as a noxious stimulus in a variety of studies because it produces the same kinds of effects as other stressors. Mammals in particular appear to react to sudden higher intensity noise, with responses including the startle response, freezing, and fleeing from the sound source. Compared with chronic background or repetitive noise, this a periodic or unpredictable noise is especially effective for provoking distress responses. Most animals become less responsive to sounds emitted for long periods or at regular intervals. The term

Annoyance does not begin to cover the wide range of negative reactions associated with noise pollution; these include anger, disappointment, dissatisfaction, withdrawal, helplessness, depression, anxiety, distraction, agitation, or exhaustion. Lack of perceived control over the noise intensifies these effects. Social and behavioral effects of noise exposure are complex, subtle, and indirect.

These effects include changes in everyday behavior (eg, closing windows and doors to eliminate outside noises; avoiding the use of balconies, patios and yards; and turning up the volume of radios and television sets); change in social behavior (eg, aggressiveness, unfriendliness, nonparticipation, or disengagement); and change in social indicators eg, residential mobility, hospital admission, drug consumption, and accident rates); and changes in mood (increased report of depression).

An understanding of animal response to helicopters or aircrafts is important in predicting the consequences of the disturbance on the ecology. Exposure of laboratory animals to noise induced increased abnormal behavior, suppressed exploratory behavior, and impaired learning. Different levels of background noise were shown to influence learning and behavior in rates (Castelhano-Carlos and Baumans, 2009). In open field behavior, continuous noise of 85 dB was shown to increase defection and reduce both social activities and non-social activities (sniffing, grooming or crawling) of rats when compared with 50 dB, 65 dB or 75 dB. Although noise of moderate intensity is commonly present during experiments on animal learning and memory, its impact has not been explored fully (Prior, 2006). Many studies indicate that sudden, novel sounds seem to affect cattle behavior more than continuous nigh noise. Noise is the milking facility has direct implication for on-farm efficiency interactions. Horses are also very sensitive to noise. Algers (1984) wrote that after the start of noise stimuli horses turned their heads and directed their ears towards the source and then immediately turned their ears away. Auditory stimuli are used by pigs as a means of communication in all social activities. Pigs exposed to 90 dB prolonged or intermittent noise increased time lying down and decreased social interaction. Behavior of adult animals in captivity is also affected by noise. In zoos and aquaria, noise from visitors increases as visitor numbers increase. Loud sound has been shown to increase vigilance and activity and agitation behaviors in pandas.

2.3 Repeated interference with sleep:

In a social survey carried out amongst people living in the vicinity of Patna Airport, some 22 percent said that they sometimes found difficulty in getting to sleep because of airport noises. In areas where the noise level was particularly high, up to 50 percent complained about the noise. An even higher percentage said they were awakened by high intensity noises, usually early at night when sleep was not yet deep. After people have been asleep for some hours, they do not readily wake up, even when subjected to very loud noises. Different people have different depths of sleep and they can adjust to nocturnal sounds. Undoubtedly, however, noisy conditions near residential areas at night must be avoided lack of continuous sleep has a counteract it. Many techniques for sound insulation are available today and can be applied at relatively modest expense.

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2.4 Effect on hearing or Deafness

These effects only become of real importance if the sounds are exceptionally loud. Continuous exposure to noise levels much above 100 dB has an adverse effect on hearing ability within a fairly short time. Many workers who are exposed to the noise of jet aircraft or very noisy workshops for even moderate periods soon develop detectable hearing defects. Today it has become the practice for workers in the situations to the equipped with ear protectors and provided these are worn all the time hearing ability is not affected.

2.5 Effect on communication or speech interference

External sounds can interfere with conversation and use of the telephone, and well as the enjoyment of radio and television programmes and like pastimes. It can thus effect the efficiency of offices, schools and other places where communication is of vital importance. The maximum accepted level of noise under such conditions in 55 dB. 70 dB is considered very noisy and serious interference with verbal communications is inevitable.

2.6 Mental or Physiological effects

Many people complain that noise makes them mentally ill. Doctors and scientist have now medically confirmed that noise disturbs the biological organisms and their respective functions of the humans. Fire crackers and other excessive and continuous explosives become physically painful giving rise the neurosis, mental illness, cardiovascular diseases, stomach ulcers and respiratory disorders reducing human life.

2.7 Effects on physical health and working efficiency or psychological problems

Noise has little physical effect on the biological performance provided that the noise level is below about 90 dB. Damage to the inner ear may result if continuous noise levels exceed about 100 dB as has been observed by the Doctors leading to physical illness. Psychiatrists and psychologists have in recent researches have made observations that noise has certain relation with physical healthy causing tension resulting in problems such as speech interference, annoyance, fatigue, sleep interference and emotional distress. Noise levels in industries causes' interference in efficiency and communication and raises possibilities of accidents. World health organization has estimated remarkable loss in the industries annually.

2.8 Effects on other animals and other living things

The effect caused by industries, railways, crackers, explosions and commotion in the cities, aircrafts etc., can be felt on animals, birds, mice, fishes and domestic animals for they are susceptible to various effects of due to exposure noise levels change their places. Birds avoid migrating to places where noise level is above 100 dB.

2.9 Effect on non- living things

Intense noise levels affect non-living things too. The noise booms cause cracks in national and archeological monuments as well as very high levels of noise are the cause of cracks in hills. High intensity explosions can break glass panes and vibrations in the buildings.

Conclusion:

This paper explores the sources, effects the excessive noise, industries, highway transport, airports, railways and public address system turns out to be major sources of noise pollution. In our life by knowingly or unknowingly everyone on the possibilities for real time control of noise pollution. In most the areas the noise level is exorbitant with more than 85 dB average is prevailing across the city during the peak hour traffic, many schools, hospitals are situated in the heart of the city are also affected severely by the noise pollution. Removal of encroachments and banning the use of air horns within the city limits.

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