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Impact of Noise Pollution on Environment: An Exploratory Study

***Abstract*: The spread of noise has a number of effects on how people and animals behave. Loud music, transportation, explosions and people are some of the leading causes of noise pollution. This study explored the factors related to noise pollution perceived by 43 college students in Kolkata. In this study, interpretive phenomenological analysis was employed.The findings revealed five domains for noise pollution impacting both physical and mental health problems in humans and animals and had latent impacts on their behaviour.**

Keywords: Environment, noise pollution, mental health, college students

Pollution is defined as any abnormal change in the environment's chemical, physical, or biological aspects. Our society is currently being polluted at an alarming rate. The measuring of sound is done in decibels. There are a range of noises in the area, such as thunderclaps (120 dB), the rustling of leaves (20 to 30 dB), and the siren's call (120 to 140 dB).A person's ears can become damaged by sound pressure levels of 85 dB or higher. Loud rock concerts, subway trains, and power lawnmowers are a few examples of sound sources that are louder than this level (between 90 and 115 dB) (110 to 129 dB)[1]. This is wreaking havoc on all forms of life on the planet. This negative impact has grown to such proportions and at such a rapid rate that, aside from politics, pollution is the most commonly debated topic in the world today.

Noise pollution refers to unwanted or unfriendly sounds that inadvertently disrupt our daily activities. It comes from a variety of places, the bulk of which are associated with urban development, such as street, air, and rail transportation, modern noise, neighbourhood, and recreational disturbances. Various factors contribute to excessive noise levels, including increasing population and increasing vehicular commotion levels. Some common causes of Noise Pollution are vehicle horns, industrial noise (friction, vibration or impact between materials in factories, and industries), musical noise from television, radios, and domestic appliances (such as washing machines, mixer grinders, air conditioners, pressure cookers, and so on) and festival noise (such as loudspeakers, firecrackers, and fireworks) cause terrible noise.

Noise pollution is a common problem in many industrial structures and other places of employment, but it can also originate from traffic on the roads, trains, and planes, as well as from outdoor construction projects[2]. Despite being present on land and in the water, noise pollution cannot be observed. It has an impact on the health and well-being of wildlife[3]. The previously quiet sea environment has become a symphony of noise and disorder due to sonar gadgets, seismic testing, ships and drilling platforms for oil.The ability of these marine animals to contact, locate, forage and find mates is hampered by excessive noise because echolocation is what they utilise for these tasks.

Humans can sense frequencies between 20 and 20,000 Hz and auditory inputs tend to make them more attentive between 2000 and 4000 Hz[4]. Noise-induced hearing loss is the most common health condition resulting from noise (NIHL).Stress, heart disease, hypertension, and sleep disruptions are further effects of loud noise.These health issues can affect people of any age, but children are especially at risk. Many children who live close to busy roads or airports have been noted to be disturbed and have trouble with memory, concentration, and readability.

Noise causes negative social and behavioural effects, such as irritability and sleep disruption, as well as negative physiological and mental health effects, as well as negative effects on performance and cardiovascular diseases[5,6]. Chronic exposure to night-time noise disrupts sleep and activates the sympathetic nervous system, increasing the long-term risk of cardiovascular disease.

A comprehensive analysis of the health effects of traffic noise is offered as well as suggestions for noise reduction methods[7]. While some studies looked at connections between traffic noise and annoyance for different urban site typologies[8], others focused on the long-term effects of traffic noise on mortality[9]. The mechanisms underpinning vascular damage brought on by noise have been thoroughly examined by researchers in a

study on the epidemiology and pathophysiology of noise-induced cardiovascular illnesses[10].

Objectives of the Study

- To explore the views of college students on noise pollution at the undergraduate level
- To know about the details,studentsperceive noise pollution at every corner of the environment

Method

Sample: Female undergraduate students in government-aided colleges in Kolkata, India were studied. This study included purposeful random sampling. 77 college students were contacted to collect data from three years of undergraduate study. Finally, 43 students aged 17-21 years decided to engage in the study (eleven from semester I, ten from semester III, and twenty-two from semester V).

Procedure: Data was collected through semi-structured interviews with female undergraduate students enrolled in three-year undergraduate programmes at Kolkata colleges. The open-ended questions were meant to gather information on how noise pollution affects the environment around us without any limitations. Questions were written in Bengali or English, depending on the comfort level of the interviewees, and mailed to them. All interviewees were asked to respond in writing and mail it back.Each pupil had a personal profile taken. The respondent's identity, however, was kept anonymous by qualitative research standards. During the interview, the students were given a few pertinent questions, such as how do you perceive noise pollution? Second, what are your thoughts on the environmental consequences of noise pollution?

Instrument: Interpretive phenomenological analysis (IPA) was the method of choice for the study's qualitative investigation. According to studies, an individual's experience with a particular affair can be fully understood using IPA[11]. By conducting an IPA interview, interviewers can have a deeper knowledge of the respondents' viewpoints based on their subjective experiences and involvement in the phenomenon[12]. IPA is commonly employed in circumstances when a small sample size is necessary to be explored in more depth[13]. In this example, IPA is being used to explore students' perceptions of noise pollution's influence on the environment.

Data Analysis:

To find the primary themes of noise pollution, all responses were carefully evaluated and all pertinent information was noted. The emerging themes were documented separately, compared, and then grouped based on their similarities and differences. This was how all of the research interviews were conducted.

Results

The responses of the college students collected through semi-structured interviews were then analysed and revealed the following aspects of their perception of noise pollution. The findings are expressed in five major themes which were obtained by grouping the responses taken from the analysis.

1. ***Noise Pollution and Mental Health*** – Noise pollution, according to all pupils, has a negative impact on people's mental health. Long-term noise exposure might result in discomfort, sleeping disturbances, anxiety and behavioural changes. Prolonged exposure to constant noise increases sensitivity to stress. People who are frequently exposed to loud noise or noise pollution are therefore more prone to feel agitated, impatient, frustrated, and furious. It has a significant impact on the individual's mood. Noise pollution can also promote depression, disturb focus, lower task performance, impair memory and have brain consequences similar to PTSD and depression. It can cause hyperacusis, or excessive sensitivity to sound, in adults and children with Autism Spectrum Disorder (ASD). People with ASD may feel dread and worry, as well as unpleasant physical sensations when they are in a noisy environment with loud sounds. Individuals with ASD may avoid noisy environments, which can lead to isolation and lower their quality of life.

   "*We are negatively impacted by noise pollution to the point where it could be harmful to our mental and emotional well-being*" (Student no. 4).

   "*People's ability to focus may be hampered by noise, eventually leading to subpar performance. It also has a negative impact on memory, making studying difficult*" (Student no. 42).

2. ***Noise Pollution and the Environment*** –Noise pollution is one of the foremost and deadliest forms of pollution affecting mankind and the environment. Noise is a disturbance to the human environment that is rapidly increasing to the point that it will pose a serious threat to human life quality and can thus be considered a social cost.

It is quite difficult for the general public to make the most of their fundamental flexibilities with the utmost care due to its thoughtless use from religious locations and in occasionally conducting religious services and discourses. Anthropogenic noise has the potential to harm invertebrates that help govern environmental processes that are critical to the ecosystem's survival. In coastal and shelf ecosystems, waves produce a range of natural underwater sounds as well as biotic communication signals that have no negative impact on the ecology. Invertebrates' behaviour alters based on the type of anthropogenic noise and is comparable to natural noisescapes.

"*The capacity of people to freely converse may be hampered by loud noise that can cause issues*" (Student no. 16).

"*Every celebration in the colony involves music being played loudly, which the residents find to be incredibly bothersome*" (Student no. 37).

3. ***Noise Pollution and Physical Health*** –Noise pollution affects millions of individuals every day. Noise pollution is hazardous to one's health and behaviour. Unwanted noise can be harmful to one's health. Tinnitus, hearing loss and other undesirable and irritating symptoms have been linked to it. When the increased use of headphones is paired with increased noise levels in the environment, the young generation is in danger of acquiring a variety of hearing impairments. In teenagers, excessive noise can cause learning problems, attention deficit disorders, insulin resistance, high blood pressure, stress-induced ulcers, and cardiovascular disease.

   "*Humans and animals are both negatively impacted by noise pollution. Human eardrums have been known to burst under extreme circumstances, leaving people deaf*" (Student no. 12).

   "*The symptoms of noise pollution include respiratory discomfort, a racing heartbeat, high blood pressure, headaches, and in cases of overly loud, ongoing noise, gastritis, colitis, and even heart attacks*" (Student no. 30).

4. ***Noise Pollution and Animal Life*** –Noise pollution also has a negative impact on the health and welfare of wildlife. Caterpillars' hearts race and bluebirds produce fewer offspring when they hear loud noises. Sound helps animals navigate, find food, attract mates, and avoid predators, among other things. Noise pollution makes it difficult for them to complete these activities, lowering their chances of survival. Noise can increase the chance of death in animals by interfering with reproduction and navigation, as well as contributing to irreversible hearing loss. Whales and dolphins suffer disproportionately from noise pollution. These marine animals rely on echolocation to communicate, navigate, feed, and locate mates, therefore excessive noise interferes with their ability to communicate, travel, eat, and find mates. Pets become more aggressive in families where there is constant noise. They are more easily disoriented and exhibit a wide range of behavioural problems. Because of the sound radiation created by planes and helicopters, many migrating birds and mammals forget their established courses and die in the middle of them.

   "*Natural habitats for birds and other animals are ruined by noise pollution*" (Student no. 9).

   "*At times animals are scared to death because of unbearable noise*" (Student no. 33).

5. ***Noise Pollution and Miscellaneous*** –Noise's impact on communication has significant societal implications, particularly for those with hearing loss, and can jeopardise safety while also lowering worker productivity and child learning. Because of background noise, significant sleep disruptions from pollution have a negative impact on someone's daytime productivity, pollution creates hypertension making the individual more susceptible to cardiovascular disease, costs human health, and results in a loss of time, talent, and money, culminating in an economic loss. Poor urban planning can produce noise pollution, and industrial and residential structures erected near one another can cause noise pollution in residential neighbourhoods. Because noise is not a gas, it's safe to infer that the noisier a region or city is (the larger the city/area, the greater the effects of noise pollution), the faster global warming will occur, leading to infrequent climate change. Noise booms produce cracks in national and archaeological sites, as well as cracks in hills due to extremely high levels of noise. High-

intensity explosions can shatter windows and cause building tremors.

"*Because high levels of background noise in the classroom interfere with hearing and focus, this excessive noise can be detrimental to students' performance*" (Student no. 7).

"*High noise levels can be harmful to instructors' hearing, especially in areas where hearing loss and tinnitus are frequent*" (Student no. 23).

Discussion

Noise pollution is one quiet evil that is gradually encroaching on our lives from a human perspective. The environment around us is being impacted by a steady stream of different types of noise, such as heavy traffic, industrial noises, loud car honking, noise from aeroplanes, trains and ships, ambient city soundscape, and general crowding in cities and municipalities. When it's busy, it might be difficult to communicate properly with one anotherand those of us who are subjected to the ongoing detrimental effects of noise pollution may have unknown and unseen mental exhaustion.

The statements made by pupils in the first domain demonstrate how conscious they are today of their mental health. They claim that continual exposure to noise might cause discomfort, sleep disruptions, anxiety and behavioural abnormalities. As a result, those who are regularly exposed to loud noise or noise pollution are more likely to experience agitation, impatience, frustration and rage. It significantly affects how someone feels. Additionally, noise pollution can worsen task performance, disrupt concentration, encourage depression and impede memory. This finding is also supported by another study[14] which showed that in addition to causing bodily harm, noise is also connected to the most common mental health conditions. Numerous issues can arise over time as a result of noise exposure in people, including aggressive behaviour, exhaustion on both the physical and mental levels, stress and anxiety, fury, loss of concentration, sleep issues and decreased productivity.Additionally, according to a study[15]that is similar to this one, people with ASD may experience dread, worry and unpleasant physical sensations when they are in a loud, noisy setting.

In the second domain, students identified noise pollution as one of the worst and most dangerous types of pollution that harm both people and the environment. They claim that because religious institutions occasionally utilize them carelessly to conduct religious rituals and lectures, it is very challenging for the general public to make the most of their fundamental liberties with the utmost care.These results are consistent with another study that found that the unpredictable use of amplifiers is to blame for the recent rise in India's noise pollution problems[16].Students also discussed how anthropogenic noise may harm invertebrates that are essential to the life of the ecosystem and help regulate environmental processes. Students also discussed how anthropogenic noise may harm invertebrates that are essential to the life of the ecosystem and help regulate environmental processes. Another study that claimed human noise is pervasive and extends outside of cities is also in agreement with this one. Even in remote areas, human activity produces noise (such as from motorboats on lakes or aeroplanes flying overhead) and these noises can get to untamed, desolate areas[17].

In the fourth area, students also discussed how noise pollution is bad for the health and well-being of wildlife. Students in the third and fifth domains acknowledged that excessive noise had a negative influence on their hearing and reduced worker productivity as well as student learningwhich also resemblances with another study[18] which demonstrated that children who are exposed to noise have shorter attention spans and perform worse on cognitive tasks than children who are exposed to tranquil environments. Children's hearing, speech and intelligence can all suffer as a result of noise in the classroom.

Conclusion

This research on college students in Kolkata found that noise pollution had negative consequences on both physical and psychological health. Major noise sources such as traffic, rail, fireworks, loud music, electrical generators and others create a variety of health problems in people of all ages and animals. A booming noise can induce sleep disorders, heart disease, excessive blood pressure, stress, and other issues like memory, attention and reading difficulties. Animals' ability to survive is lowered due to noise pollution's effects on their ability to move around, find food, attract partners, and avoid predators. It is critical to understand that the louder a region is, the larger the consequences of noise pollution and the faster the rate of global warming, which results in frequent climate change. After all, noise pollution irritates everyone. According to the kids, now is the moment to make small changes to reduce noise pollution and its consequences on humans, animals, and the environment. ❐

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