

# Impact of Noise Pollution on Human Health at Industrial SITE Area Hyderabad

Muhammad Aamir Panhwar<sup>1\*</sup>, Danish Ail Memon<sup>2</sup>,  
Aqeel Ahmed Bhutto<sup>2</sup> and Qadir Bakhsh Jamali<sup>2</sup>

<sup>1</sup>Beijing University of Posts and Telecommunications, China; maamirpanhwar@hotmail.com

<sup>2</sup>Faculty of Mechanical and Manufacturing Engineering, Universiti Tun Hussein Onn Malaysia (UTHM), Johor, Malaysia; danishmemon2013@yahoo.com, aqeelbhutto03@yahoo.com, qadirquest@gmail.com

## Abstract

**Objectives:** In daily life, noise is persistent, which sparks various health problem not only auditory but also non-auditory. In industrial occupational, the loud sound- induce hearing damage is a significant cause of the social noise exposure. **Methods/Statistical Analysis:** A brief survey was conducted at the SITE area of the Hyderabad to classify the health issue regarding noise pollution in its vicinity area. Three different types of a questionnaire about labor health issue at clinical and working environment level were used for conducting this research. **Findings:** The results of the auditory effect of noise play an adverse effect on human as deafness is 27% and auditory fatigue is 22%, which has a maximum health effect. Experimental and survey studies have indicated that the huge number of the population has apparent problems of disturbed sleep, annoyance, less outcomes in the performance of the daily life of industrial persons and an increase of hypertension with another certain cardiovascular disease. **Application/Improvements:** To avoid harmful effect due to noise pollution, the industries must follow some recommendation and prevention to use PPE, Sound Barrier wall, soundproof building and vibration proof base foundation.

**Keywords:** Auditory Effects, Impact on Health, Industrial Noise, Noise Pollution, Non-Auditory Effects

## 1. Introduction

Noise pollution is a major age-old problem for humans, as noise, which is defined as “unwanted sound” causes a temporary disruption in the natural balance leading to some health consequences. Florence Nightingale in her book entitled “Notes on Nursing” wrote that unwanted noise is the unpleasant situation is one of the abuse of care which is another way “Unnecessary noise is the cruelest abuse of care which is difficult to avoid for any age human”<sup>1</sup>. The adverse effects of noise in modern-day societies are huge as it disturbs all activities at Offices, University and houses<sup>2</sup>. Noise is a prominent feature of the modern environment including noise from industry and big machines working at a very high speed and intensity, noise from transport traffic, and neighborhood<sup>3</sup>. All these sources of noise affect our everyday life without being in our awareness. It is impossible to voluntarily shut

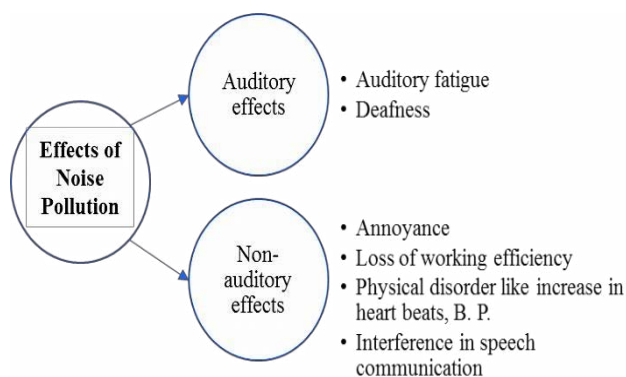
our ears to exclude unwanted auditory input even during our sleep<sup>4</sup>. In 1972, Saphiro and Baland were the first who recorded the intensity of noise pollution and described it as the “third pollution” after the air pollution and water pollution<sup>5</sup>. Noise pollution is a by-product of urbanization, industrialization, economic growth and motorized transport<sup>6</sup>.

Moreover, the fact that noise is affecting health and induces both; auditory such as nerve Fatigue and partial deafness, while another health hazard is, loss of working efficiency, annoyance, cardiac disorders, blood pressure (BP) and many more as shown in Figure 1<sup>6</sup>. Noise is a stress mediator that cause impairs concentration, communication, and sleep disturbance, changes in psychosocial behavior and more mediocre performance in all aspects of everyday life<sup>7</sup>. Foremost effects of noise are also connected to the significant level of hypertension, physiological disorders, increased heartbeat rate, and peripheral

\*Author for correspondence

vascular resistance. Also, the sound also causes a headache, irritability, nervousness, feeling of fatigue, which in combination with the all previously mentioned factors adversely and results in more severe and chronic health issues<sup>8</sup>. Sound pollution also causes autonomic nervous problems which affect the cardiovascular system and spark significant cardiovascular disease, especially when there is a long-term daily exposure or an acute exposure to noise of high intensity<sup>9</sup>.

In our work, we analyze the influence of sound pollution on human health in the vicinity area, which created from the industries in S.I.T.E area Hyderabad Sindh was evaluated. Furthermore, based on this study measurement, few recommendations are pointed out to examine its adverse effects on the peoples living in the industrial area.



**Figure 1.** Noise effects on human health.

## 2. Occupational Noise

Industrial noise is related to environmental health and safety. Long-term and repeated exposure to noise has a gloomy impact on the sense of hearing, it also effects on auditory organs, central and autonomic nervous system. Also, a study conducted by<sup>9</sup> in the USA indicates that around 30 million industrial workers of manufacturing and electrical utility industries experienced the alarming. Condition of regular noise basis. A Swedish study focused on blood pressure analyses shows that both upper and lower limb blood pressures of 44 male industrial workers have significantly higher blood pressure due to noise-induced auditory impairment than in 74 men of the same age who had normal hearing.

The low-frequency noises effects in a small demanding work situation are focused on noise sources with a leading impact of appropriate frequency (20– 200Hz)

were present in various industrial environments. The effect of low-frequency noise causes low attention, tiredness, and motivation in a low demanding work situation. Many investigations show that moderated frequency noise adversely effects of daily performance and especially impact on notice during reading and other concentrated works<sup>10</sup>. Theoretical framework explored that the physical workplace environment effects on the job performance. Majorly there are five factors (temperature, sound, air, light and color, and space of the workplace environment), which affect job performances. Industrial safety and health classify noise as dangerous to worker safety and health. Although hearing is one of the fundamental senses and plays an essential part in allowing us to understand our environment<sup>11</sup>. Noise pollution also finds its way into hospitals. Anesthesiologists also experience a higher level of noise in the operating room, which degrades the quality of communications. Sound can be reduced by isolation from the source, or ceilings and decreasing the exposure time.

## 3. Impacts of Occupational Noise

A study conducted by<sup>12</sup> reveals that the high level of sound noise leads to endocrine problems, cardiovascular disease, and digestive reactions, especially in industrial jobs. Noise in the industries also plays a significant role in causing health effect to the workers working in the different sectors. The industrial sound come under occupational health hazards, continuous long-term exposure to noise leads to the increase systolic blood pressure, stress and hearing impairment. The noise also effects in the sound detection of the mechanic sensor receptors in the inner part of the ear known as hair cell. The wave of sound excites the bundle of hair for increasing and decreasing the listening of the sound frequency. Sound noise also dangerous for the stereo cilia which may cause the death of hair cells which results in the loss of hearing because of irreversible damage to the hair cells<sup>13</sup>. An assessment carried out on the low auditory hazard incurred by occupational exposure to impulse noise with an objective to assess the standard hearing hazard. But the usage of personal protective equipment like earplug in the area of high exposure to noise or running awareness program may help to overcome this type of problems. The fact revealed by expansion model is that regular exposure to

high frequency undoubtedly harmful to hearing during 8-hour exposure<sup>14</sup>.

## 4. Methodology for Health Impact Assessment

The qualitative and quantitative study was conducted for the evaluation of noise impacts in SITE area Hyderabad, Pakistan. The questionnaire was developed for two types of responses that include medical doctors and industrial workers/staffs. Moreover, the interviews were conducted from doctors only, to analyze the diseases related to noise pollution at the affected area. Then after the data collection, the questionnaires were compiled by respondent's responses during the consultation process. The study methodology is given in flowchart as shown in Figure 2.

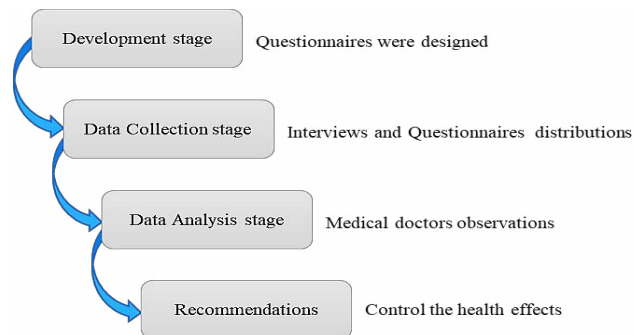


Figure 2. Study methodology flowchart.

### 4.1 Questionnaires

The survey study was conducted to know the noise effects in the vicinity of SITE Area. For the short questioner was made and send in the ground field for a response from the workers, residents, and staff of SITE area. The list of questioner is designed which was filled by inquiring multiple questions from the respective people of that area. The information in the brief questionnaires is regarding noise pollution characteristics are shown in Tables 1–3.

Table 1 relating to noise pollution diseases, Table 2 for general aspects of noise pollution and Table 3 was assigned to get a response from a hospital in the vicinity area.

## 5. Results and Discussion

Table 1 shows the doctor survey report having information regarding auditory and non-auditory effect due to

Table 1. Number of diseases

Names of Disease		Percentage
Auditory	Auditory Fatigue	22%
	Deafness	27%
Non-Auditory	Irritation	7%
	Giddiness	1%
	Nausea	2%
	Fatigue	4%
	Disturbed Sleep	11%
	Efficiency decrease	2%
	Blood Pressure Rise	9%
	Intracranial Pressure rise	1%
	Heart rate rise	2%
	rise in Breathing	2%
	Rise in Sweating	3%
	Disease related to Stress	3%
	Rapid anger	1%
	Inpatient	1%
Agitation	1%	
Disrupt Production	1%	

noise pollution. In acoustic effects, the highest consequence is deafness i-e 27%, and auditory fatigue effect is 22%. The main reason is long-term noise exposure, continues working hours for month after month and year after year. Because of industries SITE Area, Hyderabad is working 24 hour by 12 hour shift. Due to production rate, the non-auditory effects: disturbance in sleep is 11%, and the increase in blood pressure is 9%. The other non-auditory diseases highlighted in Table 1 has lower values & within the controllable ranges and may not harm to that level as a disturbance in sleep and blood pressure effects. The main reasons for such harmful non-auditory diseases can cause a Heart attack or stroke, Aneurysm, Heart failure and Trouble with memory or understanding. Table 2 is regarding awareness, practices, problems, infections, and consciousness and custom effects on rest family members due to noise pollution. The results obtained through questionnaire survey showed that majority of labor are adapted to noise pollution and neglected the safety instruction directed by concerned sections. Since the almost all industries were operated around the whole day and without following any noise pollution instructions; the higher percentage (93%) of employees were annoyed

**Table 2.** Survey questionnaire regarding noise pollution

Cat.	Sr. No	Questionnaire	%age
Awareness	A	Do you know the effect of noise on you and your surrounding persons?	
	i	Certainly aware of it, and it is harmful to ears, brain, and health	5%
	ii	No, we are not alert to noise	15%
	iii	Certainly, it annoys us daily	13%
	iv	We are habitual to noise	67%
Practices	B	Did someone come to ask you about noise pollution before?	
	i	No, we never see anyone asking such questions.	2%
	ii	Yes, few time peoples came to ask about that, but nothing happens afterward.	3%
	iii	Yes, some part of the area has done a brief survey, but peoples don't response it in a positive way.	12%
	iv	Because of lack of knowledge, we neglect the suggestion by some respective sectors	83%
Problem	C	Any specific time of high noise during the day which annoys you more?	
	i	Yes, eight to ten hours of the morning are more annoying due to loud noise	93%
	ii	Late hours of the evening are Batter	7%
Disease	D	Are you aware of disease caused by noise in your health?	
	i	No, at all.	91%
	ii	Certainly, know, such as Deafness, irritation, disturb Sleep	9%
Consciousness	iii	Hypertension, rise in Blood pressure etc.	
	E	Do you disturb because of noise in a working environment?	
	i	Certainly, we are annoyed	8%
	ii	Yes sometimes	2%
Custom effects	iii	My brain is habitual	89%
	iv	Certainly, we are too much irritated by the noise, it also affects our health, and we frequently visit ENT specialist	1%
	F	Do you peoples have any other disease, which usually happens in the family?	
	i	No, we don't have any specific disease or problem in our family	97%
	ii	Yes, some members of our family have some stress and hypertension problem due to working in the noisy environment.	3%

of noise pollution in first eight to ten working hour of the day. The possible reason for being such higher ratio is a higher number of employees & machine working to compete for the production rates. Since many industries had no any safety department and same have insufficient safety paraphernalia, the more substantial number (91%) of the employee was not aware of noise pollution safety instructions and led them to become habitual (89%) of it. During this research, the researcher efforts to find health effects of the labor's spouse due to severe noise pollution affection of worker working in the industry. The majority

family members (97%) did not find any health defect. The clinical survey conducted in this research is illustrated in Table 3. The result obtained through this survey highlighted that mostly labor (93%) is male (96%) and adult (78%). As discussed previously that there is no any appropriate safety measure and awareness in labor, most of them visited lately (85%) to clinics when the situation becomes complicated (80%). The results highlighted above alarming the health effect of labor due to noise pollution and it may directly affect the industries & economy of the country as the workforce is considered the backbone.

**Table 3.** Survey questionnaire regarding hospital/ clinical

Sr. No	Questionnaire	%age
A	Which age person majorly suffers?	
I	Frequently children	1%
II	Frequently adult	78%
III	Frequently aged	21%
B	How many time do you go to doctors?	
I	Annually	2%
II	Six months	85%
III	30 days	2%
Iv	90 days	10%
V	Seven days	1%
C	How much sick patient was when reaching to the hospital?	
I	At problematical stage patient reports	80%
II	At unclear symptoms patient reports	3%
III	At early stage patients reports	5%
iv	At an early stage, patients came, but patient have not follow medical advises	12%
D	Which gender is most affected?	
i	Female	96%
ii	Male	4%
E	Which type of work patient do?	
i	Labor	93%
ii	Office employees	7%

## 6. Recommendation

1. Industries should create the quiet soundproof building and warehouses for better regulating the noise pollution.
2. Vibration damper should be installed to reduce the Noise during the installation of heavy machinery.
3. Follow the Limits of the Noise level.
4. Labors and nearby residents should be aware of adopting Personal Protective Equipment's (PPEs).
5. Private (non-governmental) and non-private (Governmental) NGOs should respond appropriately to regulate Noise Pollution in these areas.
6. Plant more trees as they are suitable noise absorbents.
7. Use Proper Lubrication and Better maintenance.

## 7. Conclusion

Noise pollution has many adverse effects on health such as auditory fatigue, deafness, annoyance, etc. Understanding the severe impact of noise pollution and significant health effects presented in this work: deafness 27% acoustic fatigue 22% and Disturb in sleep 11% can cause impaired hearing, annoyance, and lack in efficiency and performance. To ensure for avoiding such harmful effect due to noise pollution, the industries must follow some recommendation and prevention so that they use PPE, Sound Barrier wall, soundproof building and vibration proof base foundation, etc.

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