

A Survey on Health Effects of Noise Pollution

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ABSTRACT: Noise is emerging as a major source of pollution in today's world. After air and water pollution, noise is emerging as the third most polluting factor and a health hazard and this fact has been confirmed by WHO (World Health Organisation). So an attempt was made through a survey conducted in Bharuch city of Gujarat state to study the impact of noise pollution on health of people. This paper presents the facts and observation of this survey.

KEYWORDS: Noise Pollution, Noise monitoring, Health effects of noise pollution

I. INTRODUCTION

Bharuch city situated in Gujarat state of India, has close proximity to industrial areas like Palej, Ankleshwar and Panoli. Bharuch itself has more than 16000 industrial units. The industrial development also brings about issues of environmental pollution and it includes noise pollution also. The major source of noise can be identified as transport vehicles and industrial machineries.

Statutory regulatory guidelines were prescribed both for the ambient noise levels and for work space environment noise levels factory act, 1948 prescribes the protection of workers against high noise levels (noise level > 90dB (A)). The state pollution control board and inspector of factories have powers to administer the control of noise pollution. Indian standard for ambient noise levels are mentioned in the table below:-

| Sr. No | Area category | Limit in dB (A) leq | |
|--------|------------------|---------------------|------------|
| | | Day Time | Night Time |
| 1 | Industrial area | 75 | 70 |
| 2 | Commercial area | 65 | 55 |
| 3 | Residential area | 55 | 45 |
| 4 | Silence area | 50 | 40 |

Table 1.1 standard for ambient noise levels

* dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

A "decibel" is a unit in which noise is measured.

"A", in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.

Leq: It is energy mean of the noise level over a specified period.

Source: CPCB Noise rules 2000

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II. RELATED WORK

A survey was conducted to measure the noise levels at various locations using an android application called ‘Noise meter’ 3.8.2 after calibrating with standard noise meter available in a certified Environmental Monitoring laboratory. Certain stations were identified which classified under different categories like Residential zone, commercial zone, industrial zone and silence zone. The noise readings of these stations were monitored and recorded during winter and summer seasons. Based on these reading three residential areas were identified to conduct the health survey of people to study the effect of noise.

III.RESULTS OF NOISE MONITORING

The residential area identified for survey was a) Avadhoot nagar b) Sherpura c) Matariya Talav. These residential areas were selected because the noise monitoring survey results showed that noise levels in these residential areas were beyond permissible limits.

The table given below represents the noise readings of these residential areas during winter and summer seasons.

| SR NO. | MONITORING STATION | DATE | DATA | | | | | | | | | REMARKS | |
|--------|--------------------|--------|------|------|------|---------|------|------|------|------|------|--------------------------|---------------------------|
| | | | dB | | | Peak dB | | | Leq | | | | Comparison with standards |
| | | | Min | Max | Avg | Min | Max | Avg | Min | Max | Avg | | |
| 1 | Avdhoot Nagar | 7-1-17 | 42.6 | 78.1 | 55.8 | 56.6 | 90.3 | 70.5 | 57.2 | 65 | 59.1 | Above permissible limit | |
| 2 | Sherpura | 7-1-17 | 48.4 | 83.5 | 61.8 | 64.2 | 90.2 | 75.8 | 65.7 | 72 | 63.7 | Above permissible limit | |
| 3 | Matariya Talav | 7-1-17 | 49 | 67.6 | 53.3 | 60.8 | 90.3 | 67.4 | 51.2 | 64.2 | 54.6 | Within permissible limit | |

Table 3.1.Noise levels in winter season

| SR NO. | MONITORING STATION | DATE | DATA | | | | | | | | | REMARKS | |
|--------|--------------------|---------|------|------|------|---------|------|------|------|------|------|--------------------------|---------------------------|
| | | | dB | | | Peak dB | | | Leq | | | | Comparison with standards |
| | | | Min | Max | Avg | Min | Max | Avg | Min | Max | Avg | | |
| 1 | Avdhoot Nagar | 30-3-17 | 43.8 | 77.2 | 59.3 | 58.2 | 90.2 | 74.1 | 62.5 | 69.1 | 61.9 | Above permissible limit | |
| 2 | Sherpura | 30-3-17 | 48.6 | 81.3 | 61.4 | 62.2 | 90.3 | 76.3 | 62.8 | 69.1 | 63.8 | Above permissible limit | |
| 3 | Matariya Talav | 30-3-17 | 33 | 71.9 | 41 | 45.8 | 90.3 | 55.9 | 37.5 | 64 | 48.6 | Within permissible limit | |

Table 3.2.Noise levels in Summer season

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The readings clearly indicate that the noise levels in these residential areas are more than permissible limit of 55 dB. So it was decided to conduct a health survey of the people residing over here to study the impact of excess noise levels. The main source of noise in these areas was identified to be vehicular traffic. To conduct the survey a questionnaire containing 12 questions pertaining to health issues was prepared. The following questions were included in the survey

1. Since how many years are you residing in this locality?
2. Do you suffer from sleep disorder?
3. Do you feel lack of energy and get easily tired doing your daily routine work?
4. Are you suffering from Blood pressure disease
5. Are you suffering from frequent headache?
6. Are you suffering from abnormal pulse rate?
7. Do you feel easily agitated?
8. Do you suffer from any heart disease?
9. Do you suffer from stomach disorders?
10. Do you suffer from high blood sugar levels?
11. Do you suffer from speech communication problems?
12. Can you hear properly?

For a total population of 530 residing in these areas and margin of error of 5% and 95% confidence level and an estimated response rate of 80% a total of 279 individuals needed to be surveyed. But the actual number of respondents was 160, so the margin of error worked out to be 6.48% with confidence level of 95%.

IV. RESULTS OF HEALTH SURVEY

The results of health survey are shown below:

| Name of Disease | % of people affected in | | |
|------------------------|-------------------------|----------|----------------|
| | Avdhootnagar | Sherpura | Matariya Talav |
| Fatigue | 50 | 60 | 27 |
| Blood Pressure problem | 50 | 50 | 25 |
| Sleep Disorder | 20 | 37.5 | 18 |
| Headache | 31 | 35 | 25 |
| Annoyance | 32.5 | 60 | 21.2 |
| Stomach Disorder | 15.5 | 21 | 8 |
| Loss of hearing | 18.75 | 21 | 1.2 |
| Heart related problems | 18 | 21 | 8 |

Table 4.1 Health Survey Results

The Sherpura area is more populated than other two locations and has a busy street. Therefore the noise readings also showed an increase and the problem of annoyance is also observed more in the people residing in this area.

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The chart representation is shown below:

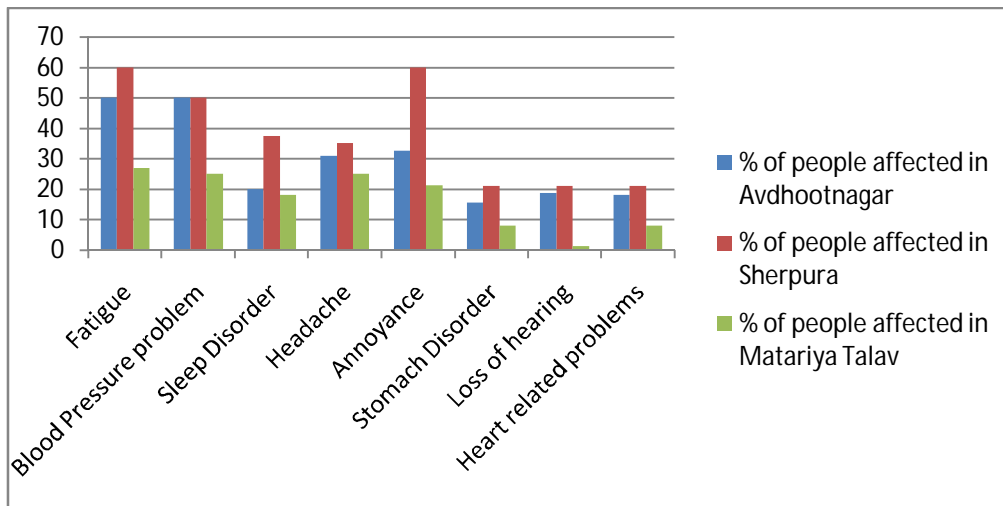


Fig. 4.1 Graphical representation of Health Survey Results

The charts present a clear comparison between health effects of noise observed in the study area of Avdhootnagar, Sherpura and Matariya talav. It is clearly visible that the health effects of noise pollution are more prominent in Sherapua as compared to Avdhootnagar and Matariya talav.

V. CONCLUSION

As observed from the results it can be concluded that the health issues of people residing in Matariya Talav are comparatively lower than Avdhootnagar and Sherpura. Moreover Blood Pressure, Fatigue, Annoyance and Headache are the major health issues faced by the people residing in Avdhootnagar and Sherpura where according to noise monitoring results the noise levels were above permissible levels. There may be other factors contributing to health disorders but noise can be considered as major contributing factor for these disorders. The major source of noise in these residential areas was identified to be the vehicular traffic. So as a remedial measure the zones should be declared as 'No Horn' area. The study also revealed that apart from adult population, the children were also affected majorly due to lack of concentration which in turn affected their academic performance. The public must be made aware of the consequences of noise on their health and remedial measures like sound proofing the homes and growing more trees should be encouraged.

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