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Assessment of Noise Pollution Level in Different Sites of Dehradun City, Uttarakhand

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Abstract The present paper deals with assessment of noise pollution in different sites of Dehradun city. The noise level was measured with the help of sound meter at six different sites of Dehradun city. These sites are Rajpur road, Clock Tower, Premnagar, Rispanapul, Saharanpur road and ISBT. Noise monitoring was carried out during morning, afternoon and evening of different season of the year (July 2015 to June 2016). During the study year period, high level of noise was recorded in afternoon of the summer season. Major sources of noise pollution are transportation and frequently use of horns in vehicles because of narrow roads and more traffic. The level of noise was found to be above prescribed noise level standard of CPCB, India. One way ANOVA between seasons were computed and found significant at $p<0.05$ level.

Keywords Noise pollution, Statistical analysis, ANOVA, Dehradun city.

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Introduction

The level of noise whether is good or bad depends upon intensity of sound level. The noise is an unwanted sound that may cause some psychological and physical stress to the living and non-living objects exposed to it [1]. In the present scenario, noise pollution is one of the major problems of urban society. It has numerous hazardous effects on the urban environment and may result in a great deal of costs on the society. [2, 3]. Almost all the countris face this problem, the main sources of this pollution are fast growth of population, increased number of vehicles, small scale industries, jet planes, garbage truck construction equipment, manufacturing processes, urbanization, rapid changes in life style, human activates and exploitation of natural resources [4]. The important reasons affecting sound values are countinuity of the city center traffic. Increase noise levels of traffic with increasing density of traffic are related with the traffic composition, the road slope, width and surface structure distance to crossroad [5]. The increased noise cause significant health effects, such as cardiovascular problems, hypertension, increased levels of diabetes and changes in social behavior and induces depressive tendencies [6]. The unit of sound intensity measurement is decibel (dB).

Dehradun city is facing noise pollution majorly because of being the capital of Uttarakhand state, where several major govenment offices and people have shifted, good job opportunities and facilities are available and hence people intend to prefer to reside here, which create extra pressure on the environmental scenario of the city. Transporation syatem,

Table 1. Seasonal variation of noise pollution in different study sites of Dehradun city (using one way ANOVA).

Study sites	Summer Mean ± Sd	Monsoon Mean ± Sd	Winter Mean ± Sd	F	P
Rajpur road	88.9 ± 9.16	84.05 ± 14.4	83.1 ± 17.1	0.153	0.861
Clock Tower	93.7 ±13.1	84.3 ± 15.5	83.7 ± 16.7	1.74	0.314
Rispanapul	91.2 ± 13.1	80.85 ± 11.7	79.0 ± 15.8	0.756	0.514
Pramnagar	97.2 ± 17.1	90.22 ± 16.6	83.9 ± 10.1	0.56	0.618
Saharanpur Chowk	95.8 ± 12.31	85.9 ± 15.3	84.3 ± 13.9	1.24	0.401
ISBT	100.7 ± 8.1	94.79 ± 13.4	87.6 ± 17.3	2.732	0.051

road network and rising rate of population are play the major role of noise pollution in Dehradun city. The present communication deals with the assessment of noise pollution at six differentsites of Dehradun city during different seasons of a year.

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Materials and Methods

The present study has been carried out in Dehradun City. The natural environment is one of the most valued elements of Dehradun city, being placed in the attractive Doon Valley that is having the Himalayas to its north, the Shivalik range to its South, the sacred river Ganga to its East and the river Yamuna to its West. Dehradun (latitudes 30° 15′ to 30° 30′ N; longitudes 78° 00′ to 78° 15′ E; Survey of India, topo sheet no 53J/3) is bordered by dense forset all around For montitoring the sound level in Dehradun city, five different sites are selected. These are Rajpur Road, Clock Tower Ripsanapul, Prem nagar, Saharanpur Chowk and ISBT.

Table 2. Environmental noise standards as precribed by the Central Pollution Control Board (CPCB), New Delhi, India.

Area code	Type of area	Environmental noise standards (Leq) in dB (A) Day time	Night time
A	Industrial area	75	65
B	Commercial area	65	55
C	Residential area	55	45
D	Silence area	50	40

Samples were collected for a period of one year from July, 2015 to May, 2016 by using instrument Digital Sound Level Meter bearing model number SL-4001. Sampling has been done fortnightly i.e., at an interval of 15 days, three times a day i.e., morning, afternoon and evening. Statistical analysis was perfoemed by using Microsoft Excel 2010.

Results and Discussion

During the present study (from July, 2015 to June, 2016) seasonal samples were collected fortnightly, three times in a day i.e. morning, afternoon and evening from different sites of Dehradun city. The results are shown in Tabular form given in Table 1 and Figure1. Tables 2 contains the Environmental noise standards as prescribed by the Central Pollution Control Board (CPCB), New Delhi, India.

Rajpur road

The maximum reading of noise pollution (88.9 ± 9.16db (A)) was recorded in afternoon during summer season and minimum (83.1 ± 17.1db (A)) during winter season. F ratio was calculated 0.153 between seasons in reference morning, afternoon and evening.

Clock Tower

The maximum reading of noise pollution (93.7 ±13.1db (A)) was recorded in afternoon during summer season and minimum (83.7 ±16.7 db (A)) in winter season. F ratio was calculated 1.74 between seasons in reference morning, afternoon and evening.

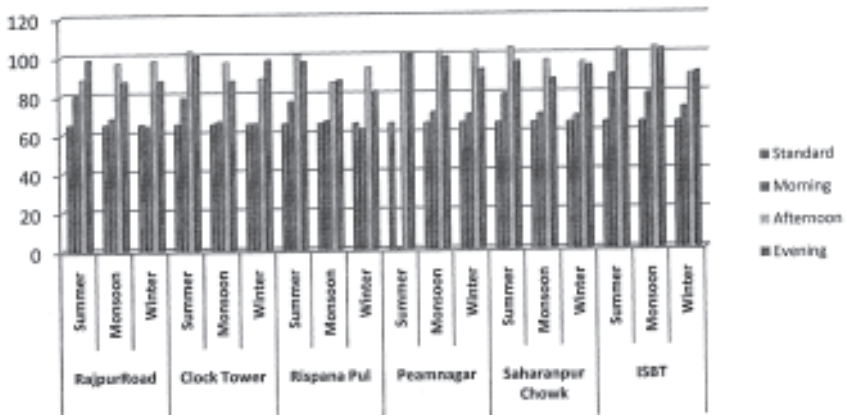

Fig. 1. Seasonal graphical presentation (morning, afternoon and evening) of noise pollution different sites of Dehradun city.

Rispana pul

The maximum reading of noise pollution (91.2 ± 13.1 db (A)) was recorded in afternoon during summer season and minimum (79.0 ± 15.8db (A)) in winter season. F ration was calculated 0.756 between seasons in reference morning afternoon and evening .

Premnagar

The maximum reading of noise pollution (97.2 ±17.1db (A)) was recorded in afternoon during summer season and minimum (83.9 ± 10.1db (A)) in winter season. F ratio was calculated 2.732 between seasons in reference morning, afternoon and evening.

Saharanpur Chowk

The maximum reading of noise pollution (95.8 ±12.31 db (A)) was recorded in afternoon during summer season and minimum (84.3 ±13.9db (A)) in winter season. F ratio was calculated 1.24 between seasons in reference morning, afternoon and evening.

ISBT

The maximum reading of noise pollution (100.7 ± 8.1db (A)) reading of noise pollution was recorded in afternoon during summer season and minimum (87.6 ± 17.3db (A)) in winter season. F ratio was calculated 0.56 between seasons in reference morning, afternoon and evening.

During the study period the noise level was recorded more than standard limits of CPCB (Table 2). The maximum noise pollution was observed at ISBT, Premnagar and Saharanpur Chowk during afternoon in the summer season due to road slope, road width, traffic. Traffic can be considered as the main source of noise pollution in large cities [7, 8]. The noise levels increase with increasing density of traffic with the traffic composition, road slope, road width, road surface structure distance to crossroad [9]. According to World Health Organization guidelines, an indoor noise level of less than 30 dB (A) is required to ensure that the restorative process of sleep takes place effectively. The people staying in noisy area especially above 70 dB (A) should take precautionary measures in order to avoid noise induced hearing loss.

Conclusion

This survey illuminates the different levels of noise pollution in different sites of Dehradun city. The survey has been made out three times a day viz; morning, afternoon and evening but the highest values of noise pollution has been observed during the after-

noon time in the summer season. This is due to the arrival of most of the tourists during this period. It is not possible to impose a ban on the tourism facility available. The major source of the noise pollution is the wide range of automobiles mostly the three wheelers. The uneven blowing of horns, improper maintenance of the vehicles, loud music systems, are adding continuously to the levels of noise pollution. During the study time, it has been found that the areas like ISBT, Saharanpur Chowk, and Premnagar holds the maximum values of the noise pollution. The main reason behind such observation in this area is due to more commercial activity. Thus, these areas are not too wide according to the range of traffic load.

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