Impact Of Industrial Noise Pollution On Human Health

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Abstract

Environmental noise levels in the Pakistan are increasing, yet there are few studies in which the non auditory effects of workplace noise are assessed. In the present study the effects of noise on biomedical parameters like blood pressure annoyance, hearing loss and headache in 100 workers at sitara chemical industry were examined. Data about noise level was collected from inside and outside locations of the industry. Demographic data and information about health status was obtained using structure interview and questionnaire method. An attempt has been made to reduce the extra noise level for controlling health hazards keeping in view idea of active noise control and filtration technique. The results of this study shows that the reduction of noise exposure by means of engineering controls or by consistent use of hearing protection by workers may positively affect health outcomes.

Keywords: Noise pollution, health hazards, active noise control, sitara chemical, Faisalabad.

Introduction

Increasing urbanization and industrialization creates a lot of problems on environment as well as on our health. Water and Air pollution are referred as major environmental pollution and get a great attention of researchers. But now days, researcher also get much attention towards noise pollution research because it also play a important role to effects environment health. Noise is unpleasant and undesirable sound at unwanted place. Noise levels are measured in Decibels (dB), One decibel is the threshold of hearing. Approximately 60 dB is the level of normal talking.

Sources of noise are divided into two categories

Noise created from industrial activity termed as Industrial source e.g. chimneys noise, different machines noise etc.

Noise created from other than industrial activity , termed as Non -Industrial source e.g. loudspeaker noise , traffic , automobiles , airplanes , construction works sound etc.

Effects of noise exposure on human health

Hearing plays an important role in behavioral and psychological activity of humans. Hearing loss is one of the most important consequences of noise exposure. There is two type of hearing loss in humans which is caused by noise exposure. Kurmis and Apps (2007) studied that the occupational noise -induced hearing loss (ONIHL) is an acquired hearing deficiency directly attributable to excessive workplace noise exposure.

Sleeping is one of the most important phenomenon reflects the different physiological and psychological activity in humans. Vallet (1979) resulted that with the noise from highway, subjects took longer to fall asleep and had less deep sleep so that the young to middle aged groups become more like the 50 – 60 year old group in their depth of sleep.

Cardiovascular Effect and Hypertension cause loss in daily life performance and lead to premature death Tomei et al (1991) correlated the cardiovascular effects with noise intensity, type and duration of exposure and resulted that there was prevalence of electrocardiogram abnormalities in pilot exposed to higher noise intensity. A number of researches showed the close relationship between noise exposures to Blood Pressure. Peterson et al (1981) showed the elevation of blood pressure on noise exposure in Rhesus monkeys . Singh et al (1982) compared the individual exposed to noise in the work place with unexposed individuals and found that B.P. and heart rate were significantly higher in noise exposed individuals, in addition 18% of the noise exposed individuals had irregular cardiac rhythms .Johsson and Hansson (1997) reported that male worker with noise induced hearing loss had higher SBP and DBP than subjects with normal hearing.

Materials And Methods

A typical chemical Mills was selected for estimation of noise levels. There were a number of units in the mills. Moreover each unit had different sections. At each point noise level was measured for ten months i.e. from January to October by averaging these readings average noise level was estimated i.e. Level of noise to which workers were exposed during the period of 8 hours.

The factory premises were divided into 25 points outside the boundary and 20 points inside the boundary. In this way two patterns of observations one inside and one outside the factory boundary were obtained. In some sections the data was recorded by varying the sites on random basis. In the beginning of the reading, the machines of the whole section were shut off. Then reading was noted by operating the machines one by one until the machines of the entire section were on. In order to compare the health hazard of workers and non workers random sample of 100 workers was taken from different areas.

Some questions from designed questionnaire were asked from those workers to asses psychological and physiological effects on them.

Results And Discussion

Data Analysis In Tabular Form

TABLE: 2KN01: Month wise average noise level (dB)

Months	Average noise level within the plant area	Average noise level at boundary
January	78.25	59.76
February	78.05	60.04
March	78.35	59.92
April	78.95	59.44
May	77.8	59.2
June	78.45	59.24
July	78.75	59.56
August	77. 75	59.04
September	78.05	59.24
October	78.3	59.4

Table: 2KN02: Health hazards

Health hazards	Percentage
Annoyance	40%
B.P	58%
Sleep disturbance	60%
Headache	40%

Table: 2KN03: Filtration method

	BEFORE	AFTER	DIFF	DENSITY
FILTER1	60.8	59.8	1	4.01
FILTER2	74.5	69.3	5.2	0.89
FILTER3	65.5	61.7	3.8	3.82
FILTER4	74.2	63.2	11	3
FILTER5	75.1	57.3	17.8	4.02
FILTER6	66.4	62.9	3.5	2.84

Table: 2KN04: statistical analysis of noise level within the plan

STANDARD DEVIATION	MEAN STANDARD DEVIATION	COEFFICIENT OF VARIANCE	P.E	R.E
0.3	**0.097**	**0.39**	**2.1**	**0.21**

Table: 2KN05: statistical analysis of noise level at boundary

STANDARD DEVIATION	MEAN STANDARD DEVIATION	COEFFICIENT OF VARIANCE	P.E	R.E
0.31	0.099	0.52	2.1	0.21

Table: 2KN06: statistical analysis of filtration method

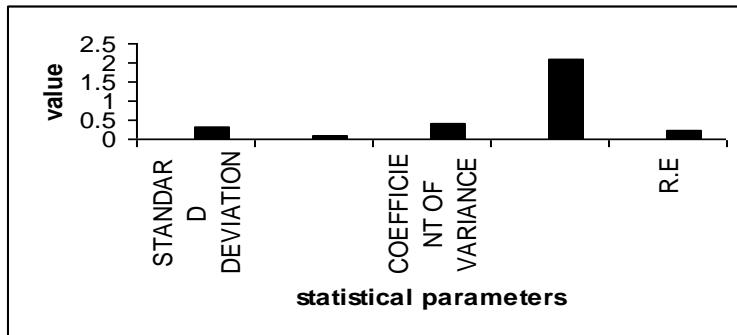| STANDARD DEVIATION	MEAN STANDARD DEVIATION	COEFFICIENT OF VARIANCE
5.99	0.99	0.08
4.04	0.67	0.06
6.23	1	0.88
1.19	0.19	0.36

GRAPHICAL ANALYSIS
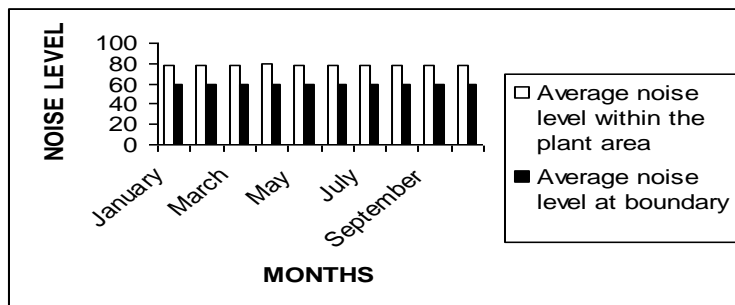
Figure 1: Graph b/w months and noise level

Figure 2: Graph b/w statistical parameters and their value
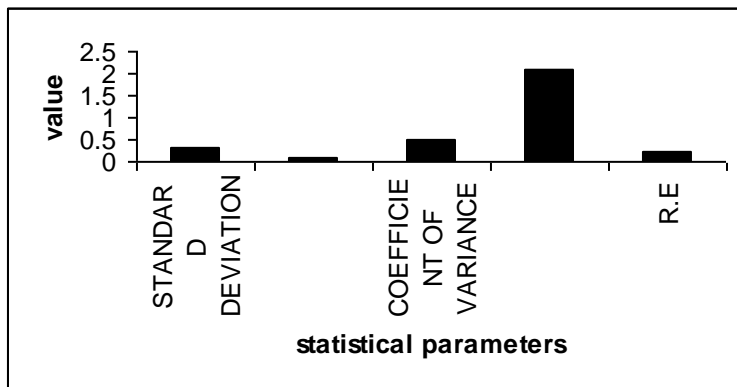
Figure 3: Graph b/w statistical parameters and their value
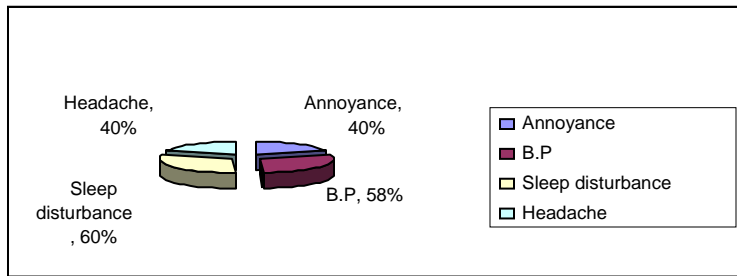
Figure 4: Graph b/w health hazard and their percentage
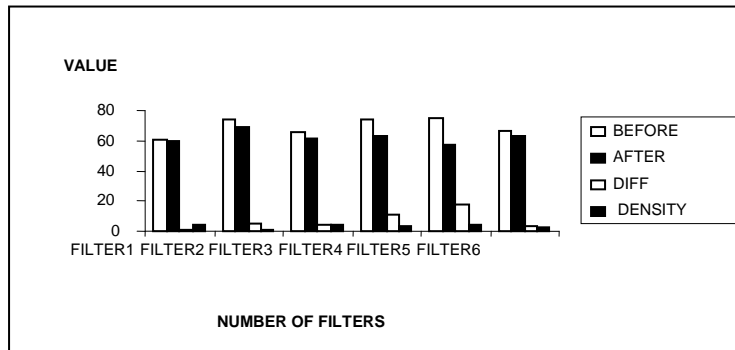
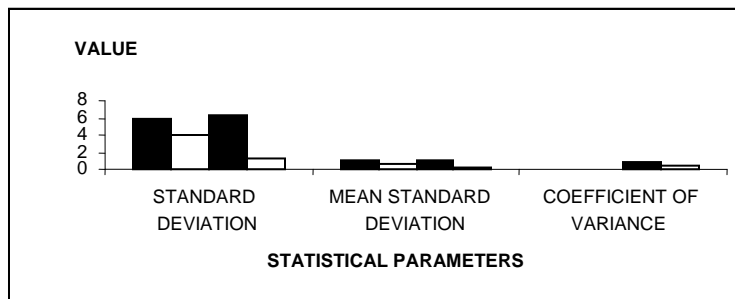Figure 5: Graph b/w number of filters and value

Figure 6: Graph between Statistical parameters and value

The present study deals with the estimation of average noise level at sitara chemical mill. The data was collected from inside and outside the industry. While analyzing the data the respective variations in the average noise level were checked .The noise level depends upon many factors such as number of working machines, speed of moving parts of machines. It was observed if the vibrating parts of the machine were free, loose, then the noise created by such machine was high.

For sociological survey a questionnaire was designed and distributed to check the psychological and physiological effects like sleep interference, headache, B.P, hearing loss etc. Some questions were asked from the workers about psychological and physiological effects of noise and the questionnaire was filled. To check the health hazards of noise on the health of the worker approximate 100 samples were taken (25 as control, 25 from workers during operation, 25 from workers during non operation conditions, and 25 from non workers). It was concluded from questionnaire that affectees of annoyance was 40%, affectees of sleep disturbance was 60%, affectees of headache was 40% and affectees of B.P was 58%. The data obtained show that the workers with length service 20^- are less affected as compared to workers with 20^+ service length. In

this way a +ve co-relationship b/w service length and psychological cum physiological effects was confirmed.

An attempt has been made to reduce the extra noise level for controlling health hazards keeping in view idea of active noise control and filtration technique luckily we have succeeded that almost at all the 5-points, having noise level greater than standards local made filters i.e. pieces of carpets worked well. There were 6 filters which were used for noise protection. The noise level before and after filtration was measured and then their difference was calculated. It was observed that noise level was reduced after filtration. The density of the filters was also measured. It was observed that filters had different density. The diff b/w noise level before and after filtration gives us information about the reduced noise level. The highest reduced noise level was 17.8dB (A). The lowest reduced noise level was 1dB A). The highest noise level was reduced by filter 5. The lowest noise level was reduced by filter 1.

Control Methods

(1) Educate the people about noise health hazards is the best way to control noise pollution.

(2) Implementation of law which provide different rules for regulating different kind of noise.

(3) Industries should use noise control devices or methods.

(4) Plant trees, shrubs etc. around industrial buildings to absorb traffic noise.

Concluding remarks

Noise pollution is a serious and neglected issue not only in Faisalabad but also throughout Pakistan. It is time for NGOs, the media, and the Government of Pakistan to work together to reduce the problem, and improve the quality of life in this country. As

many of the sources of noise pollution are unnecessary and could be reduced easily and at little cost, there is no excuse for further delaying on action. Given the magnitude of the problem, and of the human suffering that results, we can no longer afford to neglect the issue of noise pollution. For the health, sanity, and well-being of the population, and for the future of our children, it is time that we all take this problem seriously, and begin implementing solutions. Whether as individuals, NGO staff, or members of the media, we can and must take specific steps to reduce the problem of noise pollution.

Acknowledgements

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