

Research Article

**STUDY OF COMBINATION EFFECTS OF NOISE POLLUTION AND
HEAVY METALS ON HUMANS CASE STUDY - PETROL PUMP
STATION IN THE WEST TOWN OF MASHHAD**

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ABSTRACT

The main aim of this study was to examine the role of vehicles that caused noise pollution by traffic in urban environments and their effects on workers Fuel Station. In this study, two petrol stations were selected. In the first station which is placed in the urban environment and is exposed to noise pollution, Blood-pressure samples were taken From 6 people who have been worked 15 months In the second station that is located adjacent to the highway and is exposed to the less noise pollution, numbers of 6 people with equal conditions respect to treated environment were selected for taking blood samples. Also an Audiometer (tes-1358) was used to measure the external noise pollution at four sides of both stations and for 30 minutes for each side. The results showed that blood lead levels in people with experience in environments polluted have a small difference but it is thinkable. The effects of noise pollution is visible on the more absorption of lead in the treated group compared to the control group We need to more study on individuals with high work experience to know the importance of sounds in the absorption of lead in the blood of persons.

Keywords: Noise Pollution, Mashhad, Heavy Metals, Combination Effects

INTRODUCTION

Acoustic noise and particle air pollution are among the most prominent environmental stressors in cities. They often result in cardiorespiratory diseases among urban dwellers and thus counteract important urban health targets. In cities, both stressors often occur simultaneously because their main source is urban traffic. Nevertheless, little is known about the combined exposure of acoustic noise and particle air pollution and their spatial distribution in urban residential areas (Nicol *et al.*, 2014) today noise pollution is a global problem in particular for industrial workers and damage resulted from noise is amongst the 10 first harmful damages reported (Karlidag *et al.*, 2002). Exposure to noise results in some complications such as hearing loss, cardiovascular diseases, high blood pressure, mortality risk increase, serious physiological effects, headache, anxiety and nausea (Manikandan *et al.*, 2005). As chronic exposure, acute exposure can lead to the production of extra free radicals like superoxidase, catalase, and glutathione peroxidase (Manikandan *et al.*, 2005). Naturally, there is an approximate balance between the production of compounds derived from oxygen (oxidants) and the amount of antioxidant defense system activity. If the balance is broken for the compounds derived from oxygen, oxidative stress will be induced and results in biological damage (Abuja *et al.*, 2001).

MATERIALS AND METHODS

In this study, two petrol stations were selected in the first station which is placed in the urban environment and is exposed to noise pollution, Blood-pressure samples were taken From 6 people who have been worked 15 months. In the second station that is located adjacent to the highway and is exposed

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to the less noise pollution, numbers of 6 people with equal conditions respect to treated environment were selected for taking blood samples. Also an Audiometer (tes-1358) was used to measure the external noise pollution at four sides of both stations and for 30 minutes for each side.

Table 1: Level of noise pollution in Fuel Station

Location	The level of noise pollution in two stations	Standard of sound in workplace
Within the urban environment	114/59	70
Adjacent to the highway	83/58	70

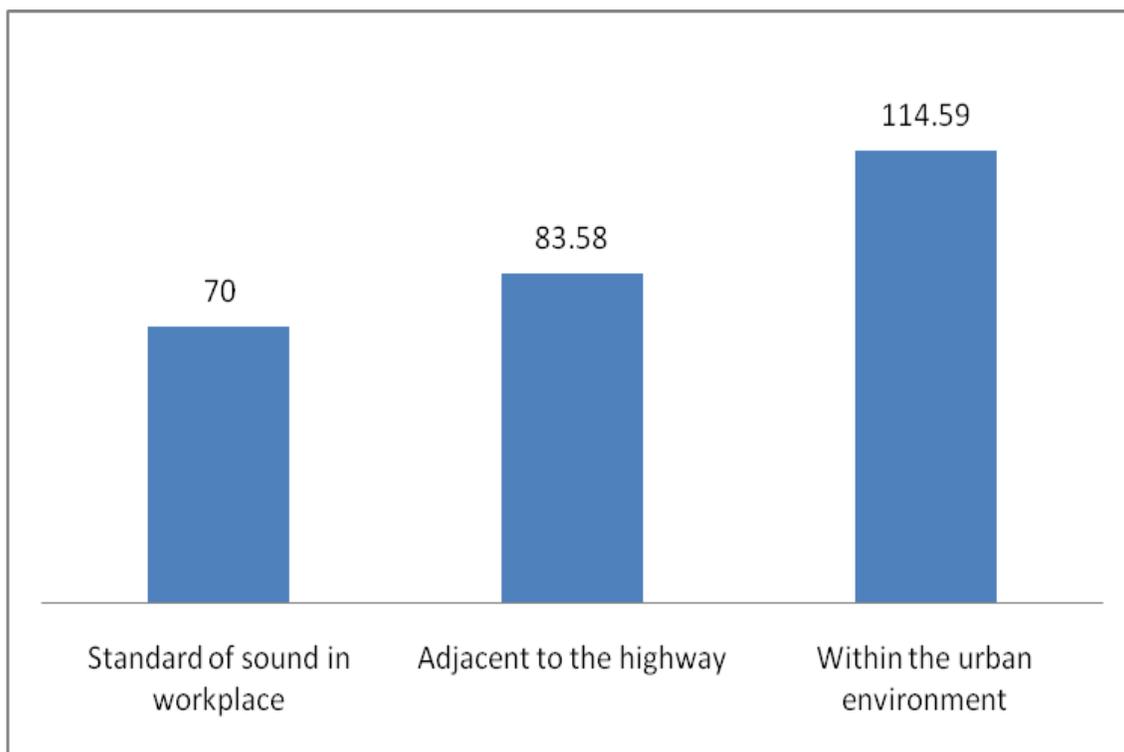


Figure 1: The level of noise pollution in two stations

Table 2: Blood lead level in two control and treatment environment

Staff	Shift work	The amount of work experience in month	Blood lead level in polluted environment in µg/lit	Blood lead level in unpolluted environment in µg/lit	Standard amount of lead in human blood
operator		15	7/21	2/33	10
operator		15	11/82	3/5	10
operator		15	9/61	1/81	10
operator		15	4/27	4/79	10
operator		15	8/73	5/5	10
operator		15	5/91	4/99	10

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RESULTS AND DISCUSSION

The effects of noise pollution is visible on the more absorption of lead in the treated group compared to the control group

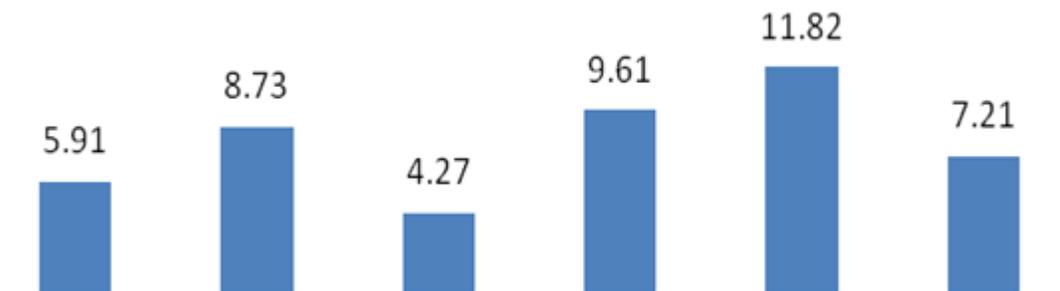


Figure 2: Blood lead level in polluted environment in µg/lit

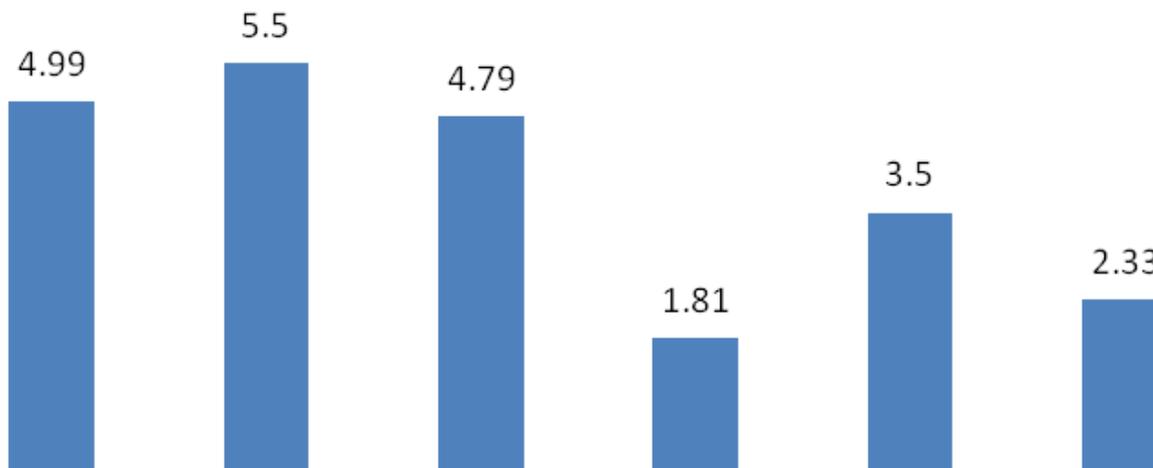


Figure 3: Blood lead level in unpolluted environment in µg/dl

Results

The results showed that blood lead levels in people with experience in environments polluted have a small difference but it is thinkable. We need to more study on individuals with high work experience to know the importance of sounds in the absorption of lead in the blood of persons.

To reduce the absorption of lead and its effects on workers should have the following apply:

- 1 - Using mask and placing queuing lines of cars outside the entrance stations
2. Planting heat resistant plants around the plant to reduce of noise pollution
3. Substitution of time standing beside dispensers randomly by operators

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REFERENCES

- Abbate C, Concetto G and Fortunato M *et al.*, (2005). Of environmental factors on the evolution of industrial noiseinduced hearing loss. *Environmental Monitoring and Assessment* **107**(1- 3) 351-61.
- Abuja PM and Albertini R (2011). Methods for monitoring oxidative stress, lipid peroxidation and oxidation resistance of lipoproteins. Review. *Clinica Chimica Acta* **306**(1-2) 1- 17.

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Demirel R, Mollaoglu H and Yeşilyurt H et al., (2009). Noise induces oxidative stress in rat. *European Journal of General Medicine* **6**(1) 20- 24.

Derekoy FS, Koken T and Yilmaz D et al., (2001). Influence of noise exposure on antioxidant system and TEOAEs in rabbits. *European Archives of Oto-Rhino-Laryngology* **285**(10) 518-22.

Karlıdag T, Yalsin S and Ozturk A et al., (2002). Role of free oxygen radicals in noise induced hearing loss: Effects of melatonin and methylprednisolone. *Auris Nasus Larynx* **29**(2) 147-52.

Manikandan S, Srikumar R, Parthasarathy NJ and Devi RS (2005). Protective effect of Acorus Calamus Linn on free radical scavengers and lipid peroxidation in discrete regions of brain against noise stress exposed rat. *Biological and Pharmaceutical Bulletin* **28**(12) 2327-30.

Nicol Weber et al., (2014). *Environmental and Occupational Medicine*, 3rd edition (Lippincotte-Raven Press) Philadelphia 1345-49.

Ohinataab Y, Yamasobae T, Schachta J and Millera JM (2000). Glutathione limits noise induced hearing loss. *Hearing Research* **146**(1-2) 28-34.