RESEARCH PAPER

Impact Of Lead Exposure On Lipid Peroxidation: A Study Among Traffic Police Personal In Dehradun District Of Uttarakhand

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Received: *20th Feb, 2026;* ***Revised:*** *4th Mar, 2026;* ***Accepted:*** *25th Mar, 2026;* ***Available Online:*** *10th Apr, 2026*

Abstract

Aim: Impact of lead exposure on lipid peroxidation: A study among traffic police personal in dehradun district of uttarakhand.

Material and methods: A total no of 100 subjects (70 traffic police personals and 30 controls) was participated in the study. A blood sample was collected from the participants by aseptic technique. 5ml blood will be collected and will quickly transferred to test tubes already containing edta anticoagulant or plane vials. Blood lead level estimated by lead care blood lead analyzer. The lipid peroxidation was estimated by the method of okhawa et. al. by measuring the malondialdehyde (mda) level.

Result: Traffic police personal are a high risk of lead exposure due to prolonged exposure to vehicle emissions and urban air pollution. This study evaluate the correlation between blood lead levels (bll) and malondialdehyde (mda), a key biomarker of oxidative stress. A cross -section study was conducted among traffic police personals, measuring their blood lead and mda levels. The resulting indicate a moderate positive correlation (r=0.259, p=0.0001) suggesting that chronic lead exposure may contribute to oxidative stress. The findings highlight the need for better occupational health policies to protect traffic police from lead -induced health risks.

Keywords: Lead Exposure, Oxidative Stress, Malondialdehyde, Traffic Police, Air Pollution, Occupational Health.

How To Cite This Article: Sharma Cs, Kushwaha Rs, Masood T. Impact Of Lead Exposure On Lipid Peroxidation: A Study Among Traffic Police Personal In Dehradun District Of Uttarakhand. Int J Drug Deliv Technol. 2026;16(26s):407-410. Doi: 10.25258/ijddt.16.26s.43

1. Introduction

Lead (Pb) is a toxic heavy metal found in vehicular-emissions, industrial-pollutants, and-contaminated dust. Traffic police personal, due to their constant exposure to road traffic pollution, are particularly vulnerable to chronic lead toxicity. Prolonged exposure can lead to neurological disorders, cardiovascular disease, and oxidative stress.

Oxidative stress is a condition where an imbalance between free radicals and antioxidants leads to cellular damage. Malondialdehyde (MDA) is widely used as a biomarker for oxidative stress, as it reflects Lipid Per-oxidation levels in the body.

2. Methodology

2.1 Study Design & Participants

A cross sectional study was conducted among traffic police personal stationed in high traffic urban area. The inclusion criteria required participants on the basis of work experience (years) in traffic control. Those preexisting medical conditions ,House-holding, drinking water habit (Ro /Tap water) affecting oxidative stress.

2.2 Sample Collection & Analysis

- Blood lead levels were measured using by lead care blood lead analyzer (Magellan Diagnostics USA, the lead care II system)
- MDA levels were analyzed using the thiobarbituric acid reactive substances.
- Pearson correlation coefficient (R-value) was calculated to assess the relationship between Blood lead level and MDA.

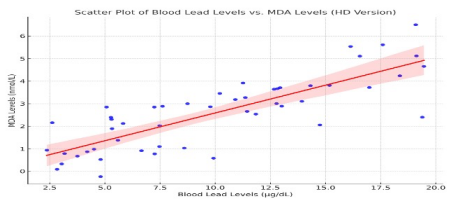
Group	**N**	**Mean lead level**	**Standard deviation**	**P-value**	**Significance**
Controls	30	6.824	1.443	0.0001	Highly Significant
Cases(traffic police)	70	15.143	4.082		

	Group	N	Mean	Std. Deviation	P Value
MDA	controls	30	51.136	24.452	0.03*
	cases	70	81.41	128.79	

3. Results

Group	**R-Value**	**P-Value**	**Significance**
LEAD vs. MDA (Traffic Police)	**0.259**	**0.0001****	**Significant**

- The correlation between Blood lead levels and MDA was found to be positive (R=0.259).
- The p-Value (0.0001) indicates that the correlation is highly significant, confirming a real association between lead exposure and oxidative stress.



3. Discussion

The results demonstrate a moderate positive correlation between lead exposure and oxidative stress in traffic police personal. Chronic lead exposure from air pollution likely contributes to elevated MDA levels, indicating increased lipid per oxidation and oxidative damage.

4. Conclusion

The study provides evidence of a significant correlation between blood lead levels and oxidative stress among traffic police personnel. given the rising pollution levels in urban areas ,it is essential to implement occupational health measures to minimize lead exposure and its long health impacts.

5. References

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