Occupational Hazard of Traffic Police – An Overview

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Abstract

Pollution from automobile exhaust and vehicular traffic density has become a serious problem particularly in metropolitan cities in India. People who are most susceptible to air pollution are those who continuously work in that vicious air i.e. traffic police, street vendors, drivers, sweepers etc. Traffic police works on clean roads to raunchy roads without whom streets/roads may be jammed. These people standing under the sun blowing their whistles and signaling traffic to move or stop while inhaling dust and exhaust fumes and they are there day in and out and these days even at some hours of the night. Traffic police personnel work within the close proximity to the vehicles. So they are exposed to high levels of air and noise pollution in a regular manner, which is largely contributed by vehicles. Air pollution can also have adverse impacts on other important systems such as cardiovascular system and central nervous system. Their working conditions remain extremely precarious and unsafe. It can induce many diseases as the Automobile emit harmful gases. As the most common route for vehicular emissions to enter the human body is inhalation, the most common effect of air pollution is damage to the respiratory system. Exposure to air pollutants can overload or break down natural defense mechanisms in the body, causing or contributing to respiratory diseases such as lung cancer, asthma, chronic bronchitis and emphysema. In addition, polycyclic aromatic hydrocarbons are the major air pollutants of automobile exhaust and were found to be mutagenic and carcinogenic. The study evaluates the hazards associated with traffic when a traffic police works for 8 hours a day. Recommendations were made to improve on safety and health issues in order to reduce the level of exposure of the workers to these hazards.

Keywords: Air quality, Exposure, Health effects, Pollutants

Introduction

Traffic related air pollution and its health effects are of drawing increasing attention especially in the urban areas. Occupational environment too plays a major role on the health of the exposed. The health hazards get more severe when the duration of exposure increases. This fact is more important in situations as the personnel engaged in traffic duty. These personnel have to undergo physical strain in an environment polluted by fumes, exhaust of vehicles, use of blowing horns, blow of dust in the air by a speeding vehicle, etc. The personnel also pursue a near-sedentary type of work as they only stand at one place for long hours or just walk a few meters, only when necessity arises. The aforementioned factors pose as a health hazard. Several studies established serious occupational health impacts due to the traffic related air pollution (Chan et al., 1991; Flachsbart, 1995, Clifford et al., 1997; Ernst and Zibrak, 1998; Flachsbart, 1999; WHO, 1999).

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Suresh et al., 2000; Ramamurthy and Thirumarran, 2001; Jinsart et al., 2002, Burgaz et al., 2002; Duci et al., 2003; Verma et al. 2003; McCreanor et al., 2007). Various studies have also investigated the relationship between respiratory health and duration of exposure in this category of occupationally exposed persons (Godin at el., 1972; Dockery et al., 1993a, Chattopadhyay et al., 2007; Han and Naehler, 2006; Ingle et al., 2005; Tsai and Huang, 2003; Duci te al., 2003; Ghose et al., 2004; Satapathy et al., 2009; Gupta et al., 2011). To ensure a steady move on the traffic congestion, the traffic police have to work in the midst of hundreds of noisy and polluting vehicles throughout their working hours. It’s a tough job, which has direct influence on their life as it is found that many traffic police suffer from critical respiratory problems, high blood pressure and gastric problems due to irregular food habits. Automobile exhaust consists of many toxic components and is considered to be a major health concern in urban areas.

Case Studies

The study done by DM Satapathy, TR Behera, RM Tripathy was a cross sectional study, conducted during 15th May 2004 to 15th July 2004 in Berhampur [1].

- All the constables were thereby taken as the study population. Health status was assessed by conducting appropriate anthropometrical, clinical, and laboratory examination of each subject. Peak expiratory flow rate was taken as best of three readings at one sitting with the help of Wright’s peak flow meter. Fasting blood sugar was conducted by using Glucose Oxidase method after taking the blood sample in the early hours of morning before joining their duty.

- Out of total 48 traffic police personnel 43 (89.6%) were males and 5 (10.4%) were females. Majority (89.6%) were between 30-50 years. The study revealed that 25% of study subjects were hypertensive. Anaemia was observed in 43.75%, musculoskeletal disorders in 27.08%, hypertension in 25%, eosinophilia in 18.75%. Respiratory disorders like rhinorrhea, chronic bronchitis, pharyngitis, etc., were observed. Only 2 persons had varicose veins of legs, which were detected by Trendelenberg’s test. This may be due to prolonged standing hours. This study revealed there were no pre-placement examination of these traffic police personnel regarding pulmonary function, and mental status nor are they being periodically examined for their health status to detect any morbidity.

The study carried by G. Rajesh Kumar, Dr. S. Raja Mohan found reasons for stress [2]:

Reasons for Work Stress

- Work overload
- Work Environment
- Lack of man power
- Increasing population
- Increasing number of vehicles

Analysis of chromosomal aberrations was carried out by V. Sree Devi, V. Durga Rao, V. V. Hara Gopal et al in 136 traffic policemen, including 78 non-smokers and 58 smokers who were exposed to vehicular exhaust for a period of 1-28 year [3]. For comparison, 115 healthy males including 69 non-smokers and 46 smokers of the same age group and socio-economic status (who were not exposed to any chemical or radiation at their workplace) were studied.

- A significant increase was observed in the mean frequency of chromosomal aberrations in non-smoker and smoker traffic policemen when compared to their respective control groups. As the duration of exposure increased in traffic policemen, there was a corresponding increase in the frequency of chromosomal aberrations. Age and duration of exposure also appear to play a vital role in causing cytogenetic damage. The study suggests that the induction of cytogenetic damage might be
due to the cumulative effect of smoking, age and duration of exposure to vehicular exhaust.

CO field monitoring was conducted by Vibhhor Sood, Shivani Sood, Rajesh Bansal, et al in Chandigarh for one hour (5 pm to 6 pm) of evening rush during January to March 2011 [4]. Pulsar single gas detector (Mine Safety Appliances, USA), were used to record the ambient CO concentrations. Rapid bump test gives results in 15 seconds interval with alarm level of 35 ppm and 100 ppm.

- At all the heavy traffic zone sampling stations the CO levels were exceeding the NAAQS. Highest concentration of CO was observed at Kisan Bhawan roundabout and the least at the Lake. Traffic lights at the roundabouts increase the idle time for vehicles which further add to the CO concentration. A long term exposure of such levels of CO concentration was reported to cause pulmonary function impairments, induction of cytogenetic damage in peripheral lymphocytes, blurry vision and difficulty in concentration (Atimtay et al., 2000; Carere at el., 2002; Burgaz et al., 2002; Satapathy, 2009). Estimated values of % COHb indicated that the traffic policemen and similar occupants who are having a long term exposure to the elevated levels of CO are liable to have health effects due to the increased CO levels.

- A cross-sectional study by Jesús A. Estévez-García, Néstor Y. Rojas-Roa, Alba I. Rodríguez-Pulidois carried with 574 traffic-police officers divided into two groups (477 traffic-police and 97 police working in an office) [5]. They were given a questionnaire inquiring about respiratory symptoms, toxicological medical evaluation, lung function tests and personal PM10 monitoring. The differences between groups were found using stratified analysis (i.e. comparing odds ratios). Multivariate analysis of factors related to symptoms and diagnosis of respiratory alteration was also performed.

- Respiratory symptoms concerned a higher prevalence of cough, expectoration and rhino sinusitis in the traffic-police group. Medical examination revealed that the traffic-police group had higher nasal irritation prevalence; lung function tests showed no difference. Mean PM10 levels were higher for the traffic police group, compared to the office work group. Traffic-police exposed to air pollution had an increased risk of developing respiratory symptoms and signs, thereby agreeing with the results of this and other studies. Personal monitoring is a valuable tool when quantifying the concentration of PM10 to which an individual has been exposed during a normal workday.

- A cross-sectional study was carried by Shweta Satish, Devare Phadke, Priyanka Patra, Rauf Iqbal on 270 traffic police personnel in Navi-Mumbai [6]. The data for this study was collected by the direct interview method with the help Copenhagen psychosocial questionnaire - medium version. The Copenhagen psychosocial questionnaire can assess physical, mental, behavioural and cognitive stress.

According to them their general and mental health are not satisfactory, reason for this could be exposure to fumes, exhaust of vehicles, improper food habits, long working hours. They also at times complain of aggression, nervousness, depression, and mood swings etc. but their vitality is good. Talking about stress, they have high behavioural stress which is why we sometimes find them aggressive, they also have a high cognitive stress hence they sometimes find difficulty in thinking and concentrating. They complain of slight somatic stress in the form of mild back & neck pain, lack of energy, muscle spasm etc.

- The study carried by Hari Sunder Shrestha, Ojashwi Nepal et al. consisted of 17 females and 89 males, constituting 16% and 84% of the total police personnel
studied, respectively [7]. In the control group of 25 individuals, 16% were female and 84% were male. Portable desktop spirometer was used for the pulmonary function test (PFT) measurements.

- It is seen that in females as compared to males, PFT parameters show a significant decrease. One-way ANOVA conducted to compare the effect of duration of air pollution exposure showed that there is a significant variation in PFT parameters among the groups. The exposure duration has significant effect on the PFT parameters. Greater the officers are engaged in traffic duty for years, greater is the decrement in their lung functions test. The questionnaire survey carried out among TPP and the controls revealed that many of the participants had short term respiratory effects such as cough, phlegm, and breathlessness.

- The study by Dr. Indrajit Roy Chowdhury was carried in Kolkata. All work of these academic tasks has been done in phases [11].

- Preliminary attempt to gather various information and secondary data in registered vehicular population, like various sources of automobile pollution, diurnal variation of vehicular pollutants and seasonal variation of air pollution at different stations in the city of Kolkata. Collection of primary data has been made with the help of structured questionnaire. After the collection of primary and secondary data, computation, tabulation and analysis of the same have been done. In this phase data have been processed to prepare relevant maps and cartographic diagrams.

- There are several type of diseases that have been observed due to maximum emission of vehicular pollution:
  - Bronchial asthma
  - Allergic alveolitis
  - Pulmonary edema

- A cross sectional, descriptive study conducted Shrestha I, Shrestha BL, Pokharel M, Amatya RCM, Karki DR at Dhulikhel Hospital, Kathmandu University Hospital in 110 responding traffic police personnel [8]. Detailed history and clinical examination of ear, impedance audiometry and pure tone audiometry was performed.

- Mean age group was 29.82 years; 74.5% were males and 25.5% were females. Mean duration of service is 11.86 years. 23.6% had tinnitus and 35.5% had blocked sensation in ear. 59.1% worked between 10-19 years. Alcohol and smoking shows positive impact on NIHL. Among 66.4% noise induced hearing loss positive cases; bilateral involvement was seen in 40.9% and unilateral in 25.4% cases. Among unilateral cases most were left sided. Hearing threshold at 4 kHz increased according to age and duration of service. Traffic police personnel are in constant risk of noise induced hearing loss.

- A Study by Rakesh V. Mishra, Sachin Rathore, Nitin Sharma, D. D. Johri, Z. Mallick was carried in Ghaziabad [9]. Noise measurement was done at selected locations with the help of a digital sound level meter. All reading was taken on the ‘A-weighting’ frequency network, at a height of about 1.5 m from ground level and on the ‘Fast’ range time weighting. 72% of the policemen have suffered from insomnia problem. More than 50% of the traffic policemen had problem in work because of the noise pollution. 60% of the policemen complained about buzzing sounds in their ears after a noisy workday. This showed the primary effects of noise in their ears.

- This study was carried by Abdelrahman A. Sliman, Omyma M. Ibrahim, Alshebli A. Ahmed in Khartoum locality in Sudan [10].
Twenty-two streets points along the Khartoum locality roads. The Khartoum locality roads have heavy traffic during the day, and the noise exposure level among traffic policemen was measured during the time period from 9:00 am to 9:00 pm on working day using a noise dosimeter which reads the noise exposure of a person. Also, 46 traffic police officers working in these points were selected as the study population.

The level of noise was higher. Major effects of noise among traffic police officer include annoyance and tinnitus. All Traffic Police officers did not used hearing protection devices.

This study was a descriptive survey done by Kalipong Darjeeling, Ms. Bhavani Chhetri, Mrs. Devina E [12]. Rodrigues on 90 traffic police personnel working in South Kanara district. A structured knowledge quesnaaire comprising about 30 items and rating scale comprising 30 items on utilization of safety measures was administered. The study revealed that in spite of the police personnel having the minimal education qualification required for policing i.e upto PUC yet they had not adequate knowledge on occupational hazards and do not use adequate safety measures.

The study was conducted by Paresh Prajapati, Krunalmodi, Kirti Rahul, Ashwin Shah at traffic booths of Ahmedabad city [13]. All traffic police personnel of Ahmedabad city were interviewed and examined. Only those who were posted in task force and interceptor were excluded. Predesigned and pretested questionnaire was used for the study. All of them were clinically examined at the booth. In the clinical test, weight, height, blood pressure, pulse, waist circumference, and hip circumference, presence of visible varicose veins, tongue, conjunctiva, nail, sclera, and teeth were examined.

It was found that many traffic police personnel suffer from critical respiratory problems, partial deafness, high blood pressure and gastric problems due to irregular food habits are also reported. Study also showed that many of them were suffering from joint problems, GiT problems, eye problems and respiratory problems that had job experience more than 3-6 years. Nearly half of them were experiencing job stress, which was disturbing their sleep pattern, appetite and family life. Hypertension and obesity was also high.

**Conclusion**

All studies showed that the adverse health impacts of automobile pollution can be significant. Traffic police is susceptible to all types of hazards physical, chemical, psychosocial, ergonomic, radiation and biological. It is also found that PPE (personal protective equipment) are not used at all places which is very harmful. Stress has a negative effect on the health of the traffic police personnel and makes them susceptible to heart attack and strokes. Noise had some effects on the personal characteristics and nervousness of the individuals as social consequences. Therefore importance of noise controlling management should be taken into considerations. As a solution to all the harmful problems caused by the traffic noise, it is necessary for these people to undergo periodical check-ups to eliminate late diagnosis of hearing capability loss and problems in the mental and nerve systems. Studies have proven that increasing age, more duration of service, alcohol intake and tobacco smoking are significant risk factors causing noise induced hearing loss. Consumption of tobacco made their condition worse.

**Recommendations**

- It is better to limit the number of personalized vehicles especially two wheelers and four wheeler because it emits more pollutants in the environment.
- Frequency of buses should be increased to cover the regular distance.
- Poor quality of fuel must be banned whereas LPG and CNG must be encouraged to reduce automobile emission.
- Strict order and regulations should be maintained to ban the encroachment on the side of road.
- Phasing out of 15 years of old or more engine vehicles from the city should be looked upon as it emits more and create traffic congestions.
- Optimization of traffic and improvement in traffic management must be followed to increase the speed of the vehicles which would reduce vehicular emission at end.
- Traffic management programme includes GPS navigation and traffic signalling system, green corridors, removal of encroachment of roads, regulation of digging roads etc.
- Improvement of vehicle technology is another systematic approach to reduce emission followed by restriction on manufacturing of two stroke engines, emission warranty and on board diagnostic system.

References


