

DETECTION AND INVESTIGATION OF AIR POLLUTION ON WORKERS' HEALTH IN BRICKS FACTORIES IN BAGHDAD AND NAJAF FACTORIES IN IRAQ:

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ABSTRACT

Air pollution increasing in last year's due to using classical treatment for environmental enhancement, these methods are the existence of brick factories used for building purposes, When using black oil directly with several mixtures of different organic compounds caused to many toxic gases after burning, with poisoning effect of the health of people who are directly treated with it and in special case for people living close to these factories, especially since the spread of these pollutants reach several kilometres away from factories.

Key words: pollution, air pollution, Bricks Factories.

INTRODUCTION

Emission of toxic elements from brick Factories is cause serious health infection, the bricks Factories send toxic fumes contain suspended particulate matters rich in carbon particles and high concentration of carbon monoxides and oxides of sulphur so_x that are harmful to humen (Omidvarborna et al., 2012).

These air pollutant's effect on mental and physical growth of human, the first sources of (so_x) the main pollutants in the air and traffic vehicles (55.8%), followed by brick Factories (28.8%) and the sources of (No_x) nitrogen oxides pollutants is also traffic vehicles (54.4%) and brick Factories (80.8%) also 25-26 percent of the country's wood production are used. Poisonous metals are environmental pollutants and these toxicity is a problem of increasing significance for ecology evolutionary, nutritional and environmental causes (Jai-shankar et al., 2014). Commonly occurring forms of Chromium are trivalent cr_3 and hexavalent cr_6 , so with both states being toxic to animals, plant and people (Mohanty et al., 2013).

In mechanism of chromium toxicity trivalent is harmless due to its weak membrane permeability, so hexavalent chromium is top active in penetrating the cell membrane through passage for isoelectric and iso structural anions such as so_4 and Hpo_4 channels and these chromates are taken through phagocytosis (Stohs et al., 1995).

Long term exposure to particulates matter and traffic related air pollutants concentration are associated with cardiovascular risk (Kaufman et al., 2016). The smoking habit could cause Cardiovascular disease progression synergistically with hyper-cholesterolemia. High affected of cardiovascular tissue to environmental pollutants is dramatically underscored by a recent report showing that heart of rates exposure to environmental tobacco

smoke accumulates as many DNA adduct the lung. (Qazzotti, 1999).

The most persuasive data to emerge from such researches interested in the effects of ambient Particulate matter on the heart disease and cardiovascular so these-research refers to association between the air pollution and cardiovascular disease (Aruni Bhatangar, 2004). Many researches refer to association between air pollution and daily mortality rates as well as between all mortality and exposure consistent association have been demonstrated (Dockery 1993, Kunzli et al., 2000, Pope et al., 2002, Samet et al., 2000).

There is engagement between air particulates and cardiovascular these-result suggested by several studies connecting between air pollution and cardiovascular hospital admissions (Dockery 1993, Polonieck et al., 1997, Schwartz 1999, Schwartz et al., 1995). Air particulates can penetrate the airway and alveoli of the lung (Nemmar, et al., 2002).

Studies show that air pollution with toxic gases affects the heart rate as it increases the irregularity of the heartbeat as the pollution affects the excitation of the heart muscle and the regulation of non-cardiac (Stone et al., 1999, Verrier et al., 2002). From heavy metals (aldehydes) which present in high concentrations in automobile exhaust and smog and are generated during combustion of organic material in coal, wood, paper or cotton, they constitute one to 2% of the volatile's generated from automobile exhaust and burning of fossil fuels (Feron et al., 1991).

Aldehydes increased in the air in parallel with particulate and various aldehydes such as carbon aldehyde, glyoxal, glyceraldehyde and hydroxyl Benz aldehyde are important constituents of particulate (Morozzi et al., 1997). According to studies, the remarkable rise of ALT (SGPT) indicates that there are medical problems such as

hepatitis, diabetes, heart failure, liver damage, bile duct problems., infectious mono-nucleosis (Paul, 2005).

Aminotransferase including aspartate AST and ALT are commonly used in evaluating liver pathologies such as NAFLD and hepatitis given that AST is produced in different tissues such as liver, heart, kidney, muscles and the brain (Kim et al.2004). The harmful effects of the air pollutions on atherosclerotic cardiovascular disease are well documented (Mallat et al., 2009).

These effects might be mediated through oxidative stress and insulin resistance. (Akha et al., 2010), which pivotal roles in the pathogenesis of fatty liver (Perez et al., 2011).

MATERIALS AND METHODS

This study was conducted on some workers working in the bricks factories which still use primitive methods in the production of bricks as the use of black oil, as a fuel for the burning of mud and the production of bricks, which causes the rise of toxic air pollutants that contain toxic elements such as lead and toxic gases such as carbon monoxide and nitrogen oxides and inhaled by workers in these factories continuously, and these factories are spread in the out skirt of the city of Baghdad as well as in Najaf city in Iraq.

The study was conduct with the selection of 50 male workers, working in the brick factories for a continuous period of more than five years, eight ml venous blood samples were separated using a centrifuge, the alkaline phosphatase test, which measures the proportion of the enzyme produced in the liver and bones and a small amounts is made in the intestines and kidneys this test is used to detect liver function. As well as the examination of the Aspartate (GPT, GOT) which is enzymes found in the liver and heart muscle through which we recognize the efficiency of the liver and heart.

Thirty samples were also selected and were also males living in residential areas of green areas in Baghdad city and the absence of factories and was conducted the same test that were conducted on all of the test using an atomic spectrophotometer along the wavelength 365.

Statistical analysis: Mean \pm standard error was calculated for all treatment.

Mean of tests and controls were compared using t – test (using a program of statistic for epidemiology) and p – values were obtained.

p. value was regarded significant if it is less or equal (0.05).

Repeated analyses of standard solution confirmed the methods precision.

Table 1: clinical findings of normal man and workers

Parameters	workers	normal	P-value
Alkaline phosphate	246.84	105.55	0.001
GPT	52	38	0.001
GOT	42	30	0.001

Value (Mean \pm Standard Error)

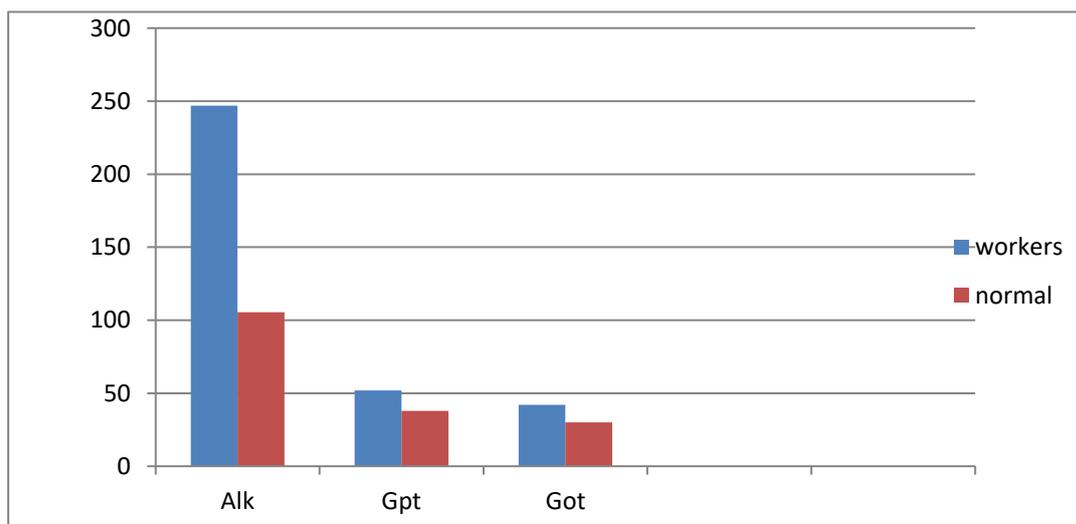


Figure 1: serum concentration of alkaline phosphatase, GPT and GOT in normal and workers.

RESULTS AND DISCUSSION

It was found through the tests (Alkaline phosphate, GOT, GPT) and in comparison to the resu-

Its of the control Group, there was a significant increase in the value of these test and this increase may be an indicator of liver, kidney and heart by

polluted air emitted from incomplete combustion of black oil and the unhealthy environment as these results are used to check the efficiency of the heart and liver and these tests were consistent with (Gehring et al., 2006) who said the long term exposure to the air pollution which contain soot increase the risk of coronary artery disease.

On other hand (Omidvarorna, et al., 2012) have reached similar results where they stated that soot, particularly diesel exhaust pollution accounts for over one quarter of the total hazardous pollution in the air, among these diesel emission components, particulate matter has been a serious concern for human health due to direct and broad impact on respiratory organs, and increased mortality rate.

Also, the presence of heavy metals in the gaseous pollutants such as the presence of lead metal has a very serious role and that is mentioned by Leonard et al., (2004). This is also confirmed by Valko et al., (2005) and Lancranjan et al., (1975) who said the presence of lead in high proportions in the body can affect a wide range of physiological and chemical imbalances in humans and in laboratory animals as well as affect the cardiovascular system, kidneys, liver, male and female reproductive system.

There are some results agree with our results which mentioned the metal component of the fly ash where detected in many extra pulmonary organs, include the liver, kidney and the heart (Wallenborn. et al., 2009, Sharma et al., 1989, Mani et al., 2007).

Our results are consistent with (Bourdon et al., 2012) which he said the harmful effects of ambient particulate in air pollution or carbon black on liver well in several laboratories animal have shown that the exposure to air pollutants causing hepatotoxicity. The effect of Vanadium which found in crude oil as an organometallic complex in producing increase lipid peroxidation in liver and cause liver damage (Fortoul et al., 2001). As for results regarding the inhalation of toxic gaseous pollutants and their effect on the heart, we agree with Ghorani-Azam, *et al.*, (2016), where increased concentration and inhalation of pollutants was associated with calcification of arteriosclerosis and accelerated atherosclerosis.

Our results agree with Sundeep M., (2017), that exposure to environmental toxins significantly increases cardiovascular risk, which contributes to the overall health burden of air pollution.

Conclusion

The study shows that the workers of the brick factories (which uses burning black oil as fuel for the process of burning clay and producing bricks)

for health problems effect the efficiency of the heart and liver according to the analysis we have done and this exposure is represented by the inhalation of workers for long periods and continuous to the burning of black oil and the spread of carbon black in the vicinity of factories and the arrival of toxic gas pollutants to a distance of several kilometres from the factories.

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