Relation between Working in Petrol Station and Blood Hemoglobin Levels for the Filling Workers in Al-Najaf City/ Iraq

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Abstract

Petrol station workers were exposed to several pollutants like air pollutants by inhalation, or skin contact with petroleum derivatives like benzene, and another port of entry. This comparative cross-sectional study was conducted to find a relationship between working in petrol stations and hemoglobin blood levels of the workers in Al- Najaf-city. The exposed worker's group was (50 male) of petrol station workers aged 20-50 years, the years of working was (1 ≥15 years) of (≥7 h/day) that included in this study, the comparison group was 50 healthy male service and office workers aged (20-50 years) matching with the study group from al-Kufa Technical Institute, Al-Furat Al-Awsat Technical University.

Blood samples were tested at the field by using a digitized portable device (hemochromax plus) which gave the blood hemoglobin concentrations at mg/dl of the petrol stations worker. The results of blood hemoglobin were compared between both groups. There was a highly statistically significant difference (HS) between Gas station workers and Control group at the *P*-value of (0.001) of Hb blood concentration levels and the mean of gas station worker and control group were (11.57 and 15.58 mg/dl) respectively. there was a highly statistically significant difference (HS) between not anemic and anemic workers at the *P*- value (0.000), and there were 47 workers (94%) out of all 50 workers had anemia after the field test.

There was a statistically significant difference (HS) between Hb levels of Gas station workers and Standard Normal Hb Level at the *P*-value = 0.007. There were a moderate inverse negative correlated between the time of exposure in the year and blood hemoglobin levels in mg/dl at the (r = - 0.57), which mean there were decreases of blood hemoglobin levels of the worker when increases of the duration of service employment. The study concluded from all results that were finding that decreased blood hemoglobin concentration than the normal value of the petrol stations workers for all stations, which might be due to the adverse effect of the workplace pollutant on bone marrow. Attention should be given by a periodical medical assessment of all workers in the petrol stations, and Obligate the petrol stations managers for supplies all personal protective equipment for all workers.

Keyword: *workplace pollutants, Hemoglobin, Anemia, Filling Workers, Al- Najaf city.*

Introduction

Health impact of occupational exposure to petrol and air pollution from the exhaust of automobile sources and un discover through petrol station workers [1]. Lack of ventilation &unused of the personal protective device at the work place when using benzene will arise the occurrence of Toxic effects of benzene and petrol derivatives in workers [2]. Repeated exposure can lead to inflammation of the respiratory tract and hemorrhage in the lung. Different air pollution like benzene and atmospheric polluted air like car exhausts, absorbed into the human body by respiratory tract or via epidermal contact [3].

Air pollutants and other chemicals like benzene or other heavy metals and carbon monoxide (CO) and carbon dioxide (CO_2)can Cause adverse health effects by body metabolites and interference with biochemical or Physiological processes of the human body [4]. Petroleum derivatives were used for different reasons by human beings at home, in manufacturing and petrol station [5].

Petrol station workers are exposed to a mixture of hydrocarbons in a fuel vapor through dispensing fuel and to the gases from car exhaust [6]. In the petrol station; the amount of Fuel spread as well as the ambient temperature interaction significantly to the arising the Emission of volatile hydrocarbons. Most people have a greater risk of exposure to gasoline vapors, these include petrol station workers, service station and drivers of cars[7].

The nature of the petrol station workers makes them readily available of the most time to exposed by skin or ingestion and inhalation. benzene & other derivatives affect blood production by affecting the bone marrow. the most characteristic effect resulting From intermediate and chronic benzene exposure was reduced the development of blood cell[8].

And causes aplastic anemia in human. The clinical finding in petrol. Hepatotoxicity cytopenia; which was a decrease in several cellular elements of circulating blood as Manifested as anemia; leukopenia and thrombocytopenia in humans. The inhalation of petrol derivatives like benzene vapor is rapidly absorbed into the blood and distributed Through the body. Several studies of benzene-exposed workers agreed that chronic Exposure to benzene at air resulting in the adverse hematological effects [9].

The aim of this study: To find a relationship between exposures to workplace pollutants and hemoglobin blood levels of the petrol station filling workers of Al-Najaf city.

Material and Method

Study Design: Comparative cross-sectional study.

Place of the study: The study was conducted in «Al-Najaf city that located to the South of Baghdad about 165Km, Iraq».

Period of the study: Data Collection was lasted from (30/1/2018 to 19/2/2018).

Sampling collections: All petrol stations that belong to governorate in Al-Najaf city were included In this study. The blood samples were collected from 7 government gas petrol stations in Al-Najaf city, the samples were tested at field of the petrol stations. From 50 person That working on it.

Questionnaire: A well-designed questionnaire was applied in this study.

Field tests: Samples were tested by using a portable digitized device portable, on each petrol station in Al-Najaf city. was used in this study to test the Hb % level of the petrol station workers (Hemochromax plus) of Korean made which was need only one blood drop to give the Hb levels results.

Statistical methods: Descriptive and analytical statics were carried out in This study by using a statistical package from social science (SPSS) version 18. Z-test was applied to obtain only statistical significance difference and Pearson correlation coefficient (r) was used to find the correlation between exposure time in years and hemoglobin concentration in blood.

Results

Table (1): comparison between study group of petrol station workers and Comparison group among age in years.

Feature	Study group (Filling workers) n = 50	Comparison group n = 50	P- value (z-test)
Age (years)	32.47 ± 6,7	34.54 ± 8.1	*0.47

* (Non-Significant)

Table (1): Show that There is non-statically Significant different between age group and comparison group at P-value = 0.47.

Table (2): Comparison between study group of petrol station workers and Comparison group of Hemoglobin concentration levels.

Parameter	Petrol station workers (n = 50)	Comparison group (n = 50)	P- value (z-test)
Hb concentration (mg/dl)	11.57 ± 1.1	15.58 ± 2.2	*0.001

* (Statistically Highly Significant) (HS)

Table(2): Show that there is a highly statistically significant difference (HS) between petrol station workers and Comparison group at the P- value of (0.001) of Hb blood concentration levels, and the mean of petrol station worker and the Comparison group were (11.57 and 15.58 mg/dl) respectively.

Table(3): Comparison details between normal (nonanaemic) and low concentrations (anemic) among the study group of petrol station workers of Al-Najaf city.

Nonanemic no. (%) (workers)	Anemic no. (%) (workers)	Total No. (%)	P- value (z-test)
3 (6 %)	47 (94%)	50 (100%)	* 0.000

* (Statistically Highly Significant) (HS)

Table(3): Show that there is a highly statistically significant difference (HS) between nonanemic and anemic workers at the P- value (0.000), and there were 47 workers (94%) out of all 50 workers had anemia after the field test.

Table(4): Summery statics comparison among a study group of petrol station workers Hb levels and standard normal Hb level in the adult.

Comparison Parameter	Test of Significance
HB levels of Gas station workers × Standard Normal HB Level	*P - value = 0.007

(Based on Z-test * S)

Table (3): Show that there is a statistical significant difference (HS) between Hb levels of petrol station workers and Standard Normal Hb level at the P - value = 0.007.

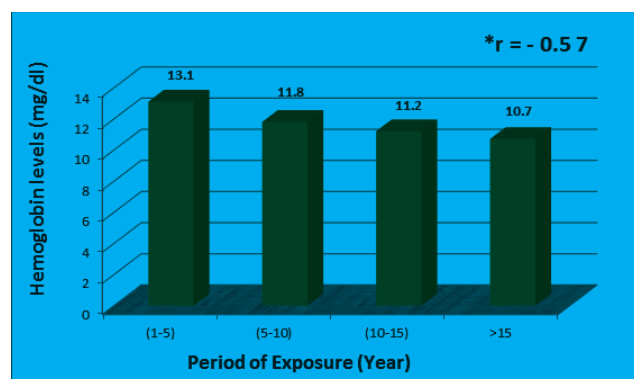(*moderate inverse negative correlated)

Figure (1): The correlation between exposure time and hemoglobin blood levels of the worker in the gas stations of AL-Najaf city

Figure (1): Show that there are a moderate inverse negative correlated between the time of exposure in the year and blood hemoglobin levels in mg/dl at the (**r = - 0.57**), which mean there are decreases in blood hemoglobin levels of the worker when increases of the duration of service employment.

Discussion

Air pollution and the dealing with petrol derivatives still have more priority for the worker when risk assessed, as well as its toxicological effect for the bodyworker. The study in the Al-Najaf petrol station could be considered the first study with this result finding, most of the worker of the study group were in the second decade of the life, the study group of the petrol station worker and healthy control group was matched for age to find if there is any significant difference for achieving the study aim.

All the results that we're found in the present study between the study group of the worker and the comparison group were significantly more among the petrol station workers than the other (control group) from the normal parameter.

The present study was showed a highly statically significant difference when comparison was made between the petrol station worker and control group in hemoglobin concentration levels, this defect might be due to the damage to the bone marrow by the toxic effect of the pollutant hydrocarbons gases that emissions from the car exhaust in the ambient air of the petrol stations and the entrance of the petroleum products like benzene or gasoline oil through the respiratory tract by inhalation or ingestion and entrance by skin contact way.

The results data in present study was showed that the most numbers and the percentage of the worker that represent of studied samples have anemia through the clear decrease of the blood hemoglobin concentration 47 (94%) respectively, with the higher statistical significant differences in comparison with non anemic worker, the same finding results were obtained by Okoro A.M. [10], of study in Nigeria of anemic worker in petrol stations at 2010.

While the different results were found in Gaza, Palestine with that mentioned by Sirddah M.M., et al in 2013, who found that the hemoglobin levels of the blood concentration levels were increases in the blood of the petrol stations workers [11].

The present study was showed a highly statically significant difference between Hb levels of petrol station workers and standard normal hemoglobin Level at the *P*-value = 0.007, The results agreement with that mentioned by Anthony Seaton, et al, 2016 in United Kingdom [12], who found that there was a high difference when compared with the normal Hb value. In addition, the same results were found by Tunsaringkarn T, et al, in Bangkok, at 2013, Thailand [13].

The present study showed that there was a moderate inverse negative correlated between the time of exposure and blood hemoglobin levels, (r = - 0.57), which mean there was a relationship between exposure time and blood hemoglobin levels, in another meaning the decreased in blood hemoglobin levels of the filling petrol station worker was happened when increased in years of service, this results might be due to continuity in exposure to workplace pollutants, the same finding results were obtained by Sahb AA, of study in Baghdad in 2013 [14].

Conclusions

The following conclusions can be derived from this study:

1.   There was a highly statistically significant difference (HS) between gas station workers and control group at the P-value of (0.001) of Hb blood concentration levels.

2.   There was (HS) between nonanemic and anemic workers at the P- value (0.000).

3.   There was an (HS) between Hb levels of gas station workers and standard normal Hb Level at the P-value = 0.007.

4.   There were a moderate inverse negative

correlated between the time of exposure in (years) and blood hemoglobin levels in mg/dl at the (r = - 0.57), which mean there were decreases of blood hemoglobin levels of the worker when increases of the duration of service employment.

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