



ASSESSMENT OF LIPID PROFILE IN BENZENE STATION WORKERS AT KHARTOUM STATE

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ABSTRACT

Background: Exposure to gasoline and benzene can lead to effects on many biological systems and metabolic process including lipid metabolism. **Methodology:** Case control study conducted at Khartoum state -sudan include 100 individuals 50 benzene station workers individuals as case and 50 non benzene station worker as control, blood sample was drawn from each participants and plasma lipid profile were estimated using cobas Integra 400 analyzer. **Results:** the means of plasma level total cholesterol (T.C), triglyceride (T.G) and low density lipoprotein (LDL) were significantly increased in benzene station workers compared to non benzene workers ($P < 0.05$), There was insignificant difference of mean plasma high density lipoprotein(HDL) between two groups ,There was positive correlation between (T.C) and body mass index(BMI) ($R = 0.344$, $P < 0.01$) , positive correlation between plasma (T.G) and duration per year in benzene workers ($R = 0.311$, $P < 0.02$) and there were no correlation with age. **Conclusion:-** these results concluded exposure to petrol fumes may be highly deleterious to the lipid profile level.

KEYWORDS: Benzene station worker, gasoline, exposure Total cholesterol (T.C). Triglyceride (T.G), High Density lipoprotein cholesterol (HDL), Low density lipoprotein (LDL).

INTRODUCTION

Benzene is chemical product derived from coal, petroleum, part of crude oil, gasoline, cigarette smoke and other fuels. Benzene is colorless liquid with sweet odor.^[1,2] Benzene is a toxic chemical a toxicity level can vary depending on the method of exposure exposure to this chemical can result in range of side effects.^[2,3]

Chronic exposure to benzene can result in hematotoxic, hepatotoxic and can affect the tissue that is responsible for producing blood cells.^[4] Some affected develop to excessive bleeding immune system deficiencies and plastic anemia, Chronic inhalation of benzene cause chromosomal problems.^[1] lipid metabolism is affected once there is liver damage since the disturbance of cell membrane lipids to be released in to circulation.^[5] One of the main hypothesis of mechanism of liver damage from petroleum metabolism is associated with oxidative stress and lipid peroxidation resulting from the imbalance between pro-oxidant and antioxidant chemical species.^[5] Exposure to benzene may also reduce the microsomal mixed function oxidase. P450 is probably responsible for the oxygenation of benzene, but also has propensity to generate oxygen radical. Oxygen radical is measure cause of benzene toxicity.^[2,5,6] There is scarcity of information on whether exposure to benzene may be risk factor to atherosclerosis or not. Atherosclerosis and

cardiovascular disease are known to among from early cause of deaths.^[7,8] Atherosclerosis is known to be characterized by low level of high density lipoprotein (HDL), high level of total cholesterol (T.C), low density lipoprotein (LDL) and triglycerides (T.G) in the plasma.^[9,10] Literature review study result showed that exposure to gasoline vapours caused significant increase serum TC, TG, LDL (P value < 0.05) and significant decreased HDL (P value < 0.05)^[11], this study aimed to evaluate the possible effect of gasoline and benzene exposure on lipid profiles

MATERIALS AND METHODS

This is a case control study conducted at gasoline station in Khartoum state during March to May 2016, Included 50 adult male benzene workers as case and 50 non benzene workers individual as control matched age and BMI .all individuals at risk to hyperlipidemia, such as diabetes mellitus, hypertensive, myocardial infarction, obesity, smoker and alcoholism were excluded from this study.

Early morning (7:30-9:30) am Venous blood samples were collected from each participants after obtain consented. The plasma sample, kept frozen at -80°C until day of assay. Lipid profile were measured with

enzymatic method by (Cobas Integra 400) as manufacture recognition.

RESUT

There was significant increase in T.C, T.G, and LDL between the case and control, Insignificant difference in HDL between case and control (Mean $\pm$ SD, p. value) shown in (table 1), There was positive correlation

between T.G and duration (R .311, p .v 0.02), No correlation with T.C, LDL, HDL show as (table 2). No correlation between age and study parameters show in (table3). There was positive correlation between T.C and BMI (R .344 p. v 0.01), No correlation between T.G, LDL, HDL and BMI show as (table 4). Pearson correlation (R) P. value (P) Significant P. value < 0.05.

Table 1: comparison of study parameters between case and control

Aram Eter	Control N= 50	Cases N= 50	p. value
Holes Terol	154.88 $\pm$ 32.01	173.4 $\pm$ 51.1	.022
Riglyc Eride	109 $\pm$ 49.36	146 $\pm$ 106.93	.020
HDL	38.1 $\pm$ 7.7	38.6 $\pm$ 16.23	.830
LDL	88.63 $\pm$ 24.99	38.6 $\pm$ 16.23	.028

Table 2: Correlation of study parameter with duration of workers (per/year)

	R	P
Cholesterol	.129	.373
Triglyceride	.311	.023
HDL	.150	.298
LDL	.023	.873

Table 3: Correlation of study parameters with age of workers (per/year)

	R	P
Cholesterol	.223	.120
Triglyceride	.106	.464
HDL	.230	.109
LDL	.085	.557

Table 4: Correlation of study parameters with BMI of workers (kg/m2)

	R	P
Cholesterol	.344	.015
Triglyceride	.116	.251
HDL	.016	.914
LDL	.267	.061

DISCUSSION

In this study, lipid profile in exposed to gasoline and benzene was evaluated. statistically increase significant difference in the mean of plasma T.C, T.G and LDL level was observed group when compared in the test against the control. Mean HDL was insignificant This finding agree with Uboh, et al.^[11] The result showed that exposure to gasoline vapours caused a significant increase (p < 0.05) in plasma T.C, T.G, LDL.C and significant decrease in plasma HDL. But the insignificance of HDL was in contrast to the study of Uboh.^[11] Our finding is agreement with N Am et al.,^[12] result show as, lipid profile in rats exposed to premium motor spirit fume was evaluated, a significant increase in T.C and LDL, significant decrease in TG ,insignificant HDL. But the decrease TG level was dis agree with this study.^[12] This significant increase in lipid profile is an indication that inhalation exposure to petrol fumes may

affect lipid metabolism. That suggestive as a risk factor to atherosclerosis. We recommended to measure plasma level of ox-LDL. this was first established through the use of antioxidant in atherosclerosis-prone hyperlipidemia. Ox-LDL is taken up by the macrophages, which become foam cell^[13,14]

CONCLUSION

In an age matched case control study high level of lipid profile in benzene workers has been found to be associated with increases risk of atherosclerosis in Khartoum population.

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