

Original Research Article

Assessment of liver Enzymes level among Sudanese Gasoline Station WorkersHajir Taj Elsir Hamd¹, Abdelgadir Eltom^{2*}¹Medical Laboratories department, college of allied health sciences, Gulf Medical University, Ajman, UAE²Faculty of medical laboratory science, University of Sudan for science and technology, Khartoum, Sudan***Corresponding author**

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Abstract: The effects of gasoline inhalation on human health are serious and in many cases, deadly, this is a case control study conducted during period from February to March 2015 for measure blood AST, ALT and ALP activities among gasoline station workers and non-gasoline station workers. Fifty gasoline station workers were selected as test group and 50 non-gasoline station workers as control group (age was matched (17-55)), blood specimens collected from both groups, and serum AST, ALT and ALP activities were determined by using auto analyzer. A significant increase in means of serum AST, ALT and ALP activity on case group when compared to control group, P. value = (0.001), (0.01), (0.001) respectively. The results also showed a significant positive correlation between age and serum AST, ALT and ALP activity (Serum AST activity P= 0.0001, r = 0.67), (Serum ALT activity P=0.0001, r = 0.45) and ALP (P= 0.02, r =0.23). Statistical analysis also showed a significant positive correlation between duration of work and serum AST, ALT and ALP activity (serum AST activity P=0.04, r =0.28), (serum ALT activity P=0.045, r =0.28), and (serum ALP activity P=0.001, r =0.44). The study results revealed that gasoline inhalation leads to significant elevation of serum AST, ALT and ALP. Increases in AST, ALT and ALP is proportional with duration of work at gasoline station per years, also. The serum AST and ALT activities are showed significant positive correlation with age. Serum AST, ALT and ALP activities are showed significant positive correlation with duration of work at gasoline station workers.

Keywords: Gasoline, Liver enzyme (AST, ALT, ALP)

INTRODUCTION:

Gasoline is a very volatile liquid widely used as fuels for automobiles and other internal combustion engines, it containing several organic, aromatic and inorganic compounds. Some of its constituents are highly carcinogenic to humans and has other human health effect [1, 2]. The potential health hazards associated with chronic or sub-chronic exposure to gasoline has attract the attention of the general public and scientific community which have been reported in animal experiments that exposure to gasoline vapors produced various toxicity effects in many tissues [3].

Recent studies highlight changes in serum lipid profile and signs of hepatic oxidative stress, hematotoxicity, reproductive toxicity and nephrotoxicity closely associated with drivers and workers occupational exposures to gasoline [4]. Previous studies show that the bilirubin, ALT, AST, urea and plasma creatinine were significantly increased in gasoline exposed individuals than in unexposed people. While the serum concentration of total protein,

albumin, sodium and calcium were significantly decreased [5, 6].

MATERIALS AND METHOD:

The study is descriptive and design is cross-sectional case control community based study utilized the quantitative approach in which the serum liver enzymes level are measured kinetic U/L in Sudanese gasoline station workers, fifty random blood samples were collected from males Sudanese gasoline station workers in addition to fifty healthy individuals as control group for the comparison of serum liver enzymes level, exclude Person suffering from liver diseases.

a. Liver enzymes estimation (AST, ALT, ALP)

Kinetic spectrophotometric method using mindray chemistry Auto analyzer Bs200

b. Ethical consideration:

Approval for this study was taken from the department of clinical chemistry verbal consent was taken from both test and control subjects.

c. Quality control

Sample representing the normal and pathological level of serum liver enzymes, was used for assessment of the quality control. Result±2SD of the target values of the control sera were accepted.

d. Statistical Analysis

Data was analyzed by computer software, by using SPSS program manual master sheet. The mean and standard deviation of liver enzymes level were obtained, and the test was used for the comparison of liver enzymes level among the test and control group and the mean difference is significant at $p \leq 0.05$, Correlation(r) of liver enzymes level among both, age and duration of works is considered to be statistically significant at $p \leq 0.05$

RESULTS:

The study population comprised of 100 individual in Khartoum state 50 test subject works at gasoline station, with age range from 16-55 years and duration from 1- 17 years, In addition to 50 healthy volunteers were age and gender matched with their

corresponding test groups. As illustrated in table 3.1 there is significant increase in serum liver enzymes level in test group when compared with corresponding control group (30 ± 10.6 U/L, $p \leq 0.001$, 22 ± 11.9 U/L, $p \leq 0.01$, 132 ± 40 U/L, $p \leq 0.001$ for AST, ALT and ALP respectively). As illustrated in figure 1 correlation between serum AST activity (IU/L) and duration of work (years) in Gasoline stations ($r = 0.28$, p . value = 0.04), Figure 2: correlation between serum ALT activity (IU/L) and duration of work (years) in Gasoline stations ($r = 0.28$, value = 0.045) and Figure 3: correlation between serum ALP activity (IU/L) and duration of work (years) in Gasoline stations ($r = 0.44$, value = 0.001). Also as illustrated in figure 4 correlation between serum AST activity (IU/L) and age of workers at Gasoline stations in Khartoum state ($r = 0.67$, value = 0.0001), Figure 5: correlation between serum ALT activity (IU/L) and age of workers at Gasoline stations in Khartoum state ($r = 0.45$, value = 0.0001) And figure 6 correlation between serum ALP activity (IU/L) and age of workers at Gasoline stations in Khartoum state ($r = 0.23$, p .value = 0.02).

Table 1: Comparison of Liver enzymes activity between Gasoline station workers and healthy individuals

	Gasoline station's workers (n = 50)	Healthy individuals (n=50)	p.value
AST (IU/L)	30.3 ± 10.6	24.3 ± 5.6	0.001
ALT (IU/L)	22.3 ± 11.9	17.6 ± 6.2	0.01
ALP (IU/L)	132 ± 40.4	110 ± 20.4	0.001

Data represent mean ± SD, p. value was calculated using Student T. test

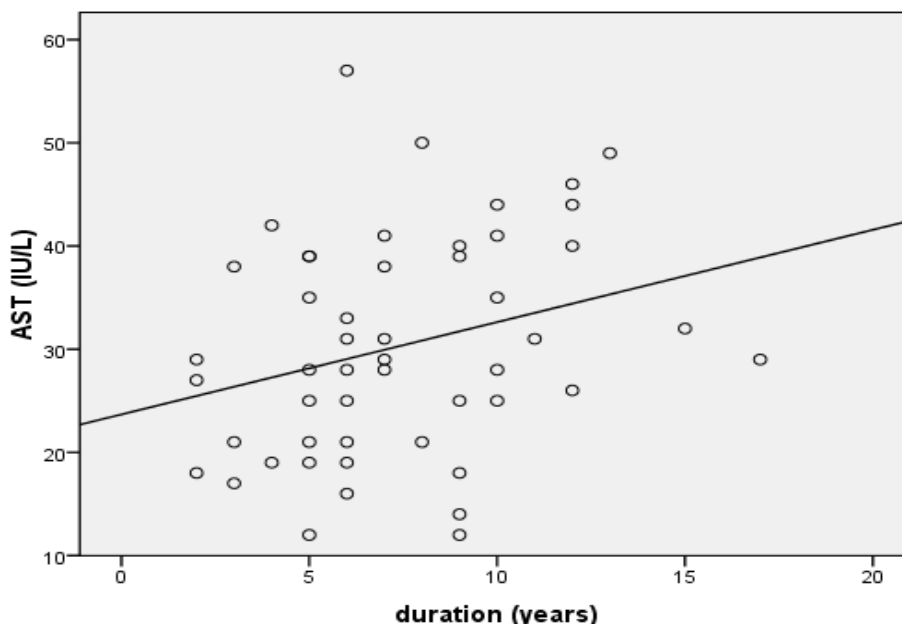


Fig 1: correlation between serum AST activity (IU/L) and duration of work (years) in Gasoline stations ($r = 0.28$, p . value = 0.04)

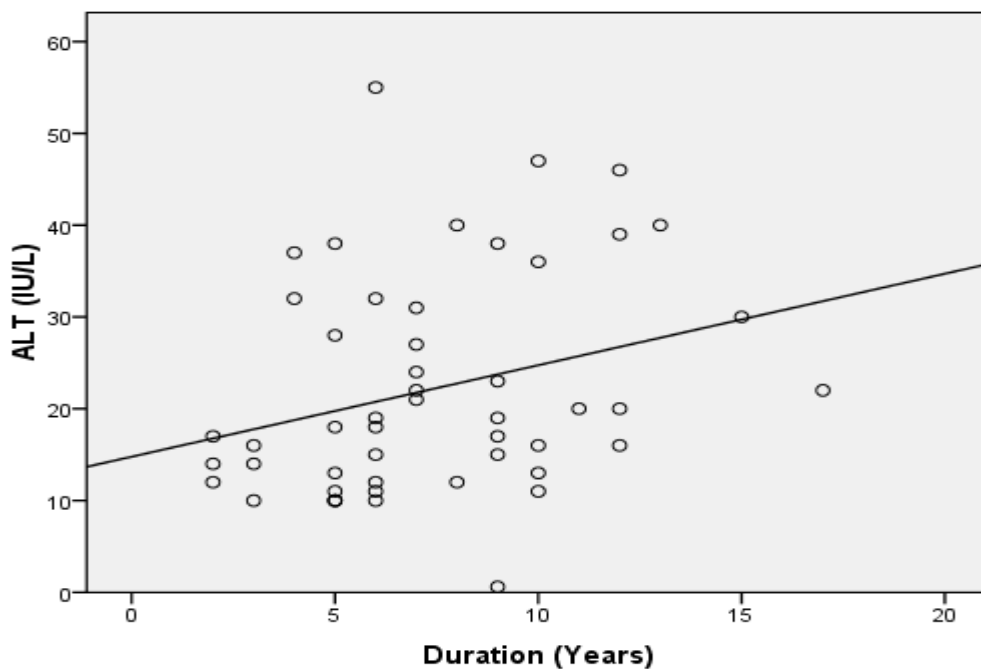


Fig 2: correlation between serum ALT activity (IU/L) and duration of work (years) in Gasoline stations ($r = 0.28$, p . value = 0.045)

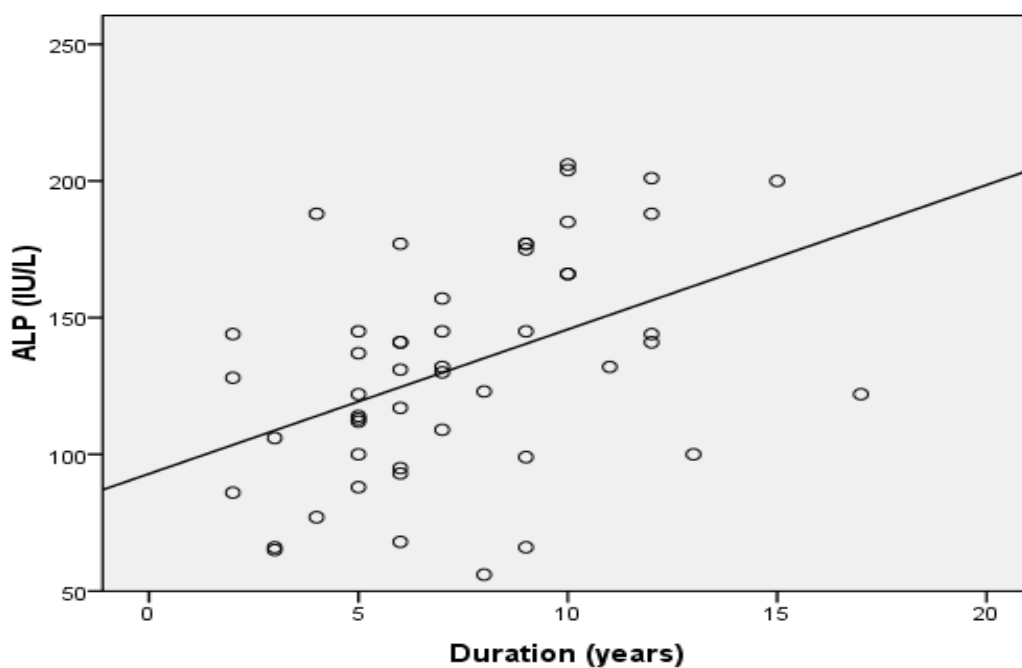


Fig 3: correlation between serum ALP activity (IU/L) and duration of work (years) in Gasoline stations ($r = 0.44$, p . value = 0.001)

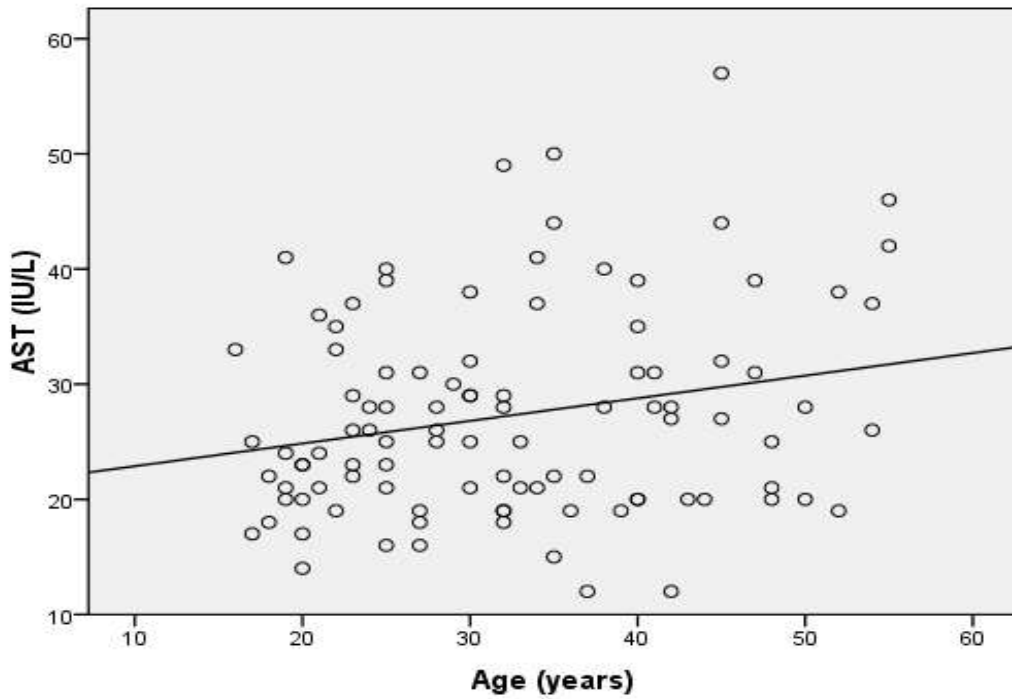


Fig 4: correlation between serum AST activity (IU/L) and age of workers at Gasoline stations in Khartoum state ($r = 0.67$, p value = 0.0001)

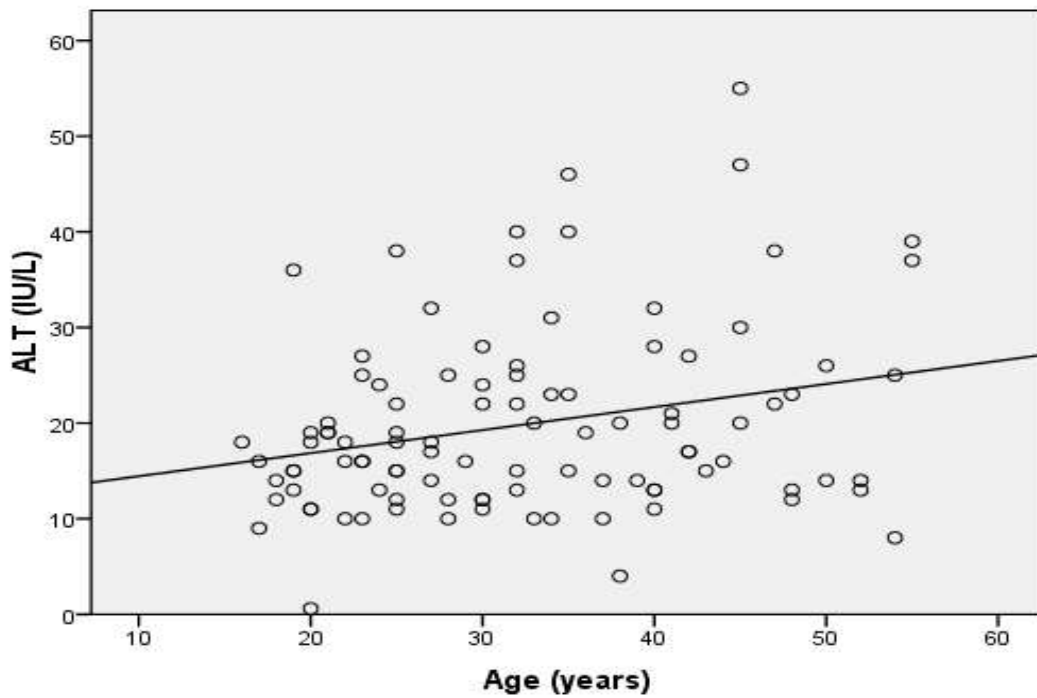


Fig 5: correlation between serum ALT activity (IU/L) and age of workers at Gasoline stations in Khartoum state ($r = 0.45$, p value = 0.0001)

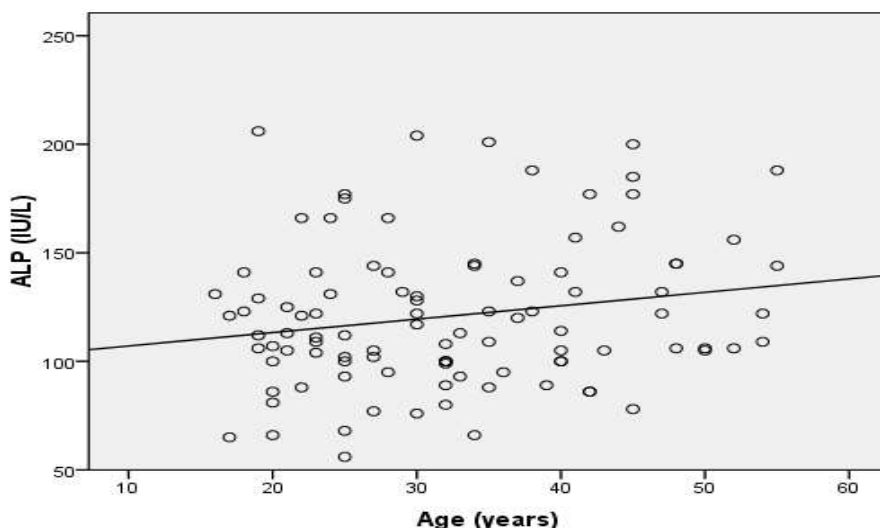


Fig 6: correlation between serum ALP activity (IU/L) and age of workers at Gasoline stations in Khartoum state ($r = 0.23$, p value = 0.02)

DISCUSSION

This study was done to evaluate serum liver enzymes level among Sudanese gasoline station workers a 50 workers included in this study and 50 healthy people. The result of this study showed that there is a significant increase between study group and control group in serum liver enzymes level among gasoline station workers group (30 ± 10.6 U/L, $p \leq 0.001$, 22 ± 11.9 U/L, $p \leq 0.01$, 132 ± 40 U/L, $p \leq 0.001$ for AST, ALT and ALP respectively). And there are correlation between serum AST activity (IU/L) and duration of work (years) in Gasoline stations ($r = 0.28$, p .value = 0.04), correlation between serum ALT activity (IU/L) and duration of work (years) in Gasoline stations ($r = 0.28$, p .value = 0.045) and correlation between serum ALP activity (IU/L) and duration of work (years) in Gasoline stations ($r = 0.44$, p .value = 0.001). Also there are correlation between serum AST activity (IU/L) and age of workers at Gasoline stations in Khartoum state ($r = 0.67$, p .value = 0.0001), correlation between serum ALT activity (IU/L) and age of workers at Gasoline stations in Khartoum state ($r = 0.45$, p .value = 0.0001). And correlation between serum ALP activity (IU/L) and age of workers at Gasoline stations in Khartoum state ($r = 0.23$, p .value = 0.02). This study is agree with another study done at Malaysia which found Serum ALP level was significantly increase all groups of rats exposed to gasoline vapor compared to control group, Control 424.8 ± 85.03 - Gasoline Vapor Receiving (1 h) 768.4 ± 163.6 , Gasoline Vapor Receiving (2 h) 741.8 ± 135.34 , Gasoline Vapor Receiving (3 h) 675.2 ± 120.37 [7]. And also agree with other study done at Nigeria that found increases in the serum levels of AST, ALT, ALP, Chol, TG in the petrol exposed group were 177%, 140%, 191%, 100% and 97%, respectively, when compared with the controls [8].

CONCLUSION

This study revealed that exposure to gasoline because significant increase in serum liver enzymes level. Also there is correlation between the duration, age of works and level of the enzyme.

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