

## Effect of Cigarette Smoking on some Liver Functions Test

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### Abstract:

**Background:** *Cigarette smoking is one of the 10 greatest contributors to global death and disease. Cigarette contains harmful chemicals such as carcinogenic, cytotoxic and free radicals, which are affect many organs. Our study aimed to assess the effects of dose response of tobacco exposure on liver function among male population in Khartoum-Sudan.*

**Methodology:** *It is case control study which include hundred Sudanese participant smoker male, aged between (25~60 years), the participant divided into two groups, (50 smoker) and (50 non smoker) as control. The smoker group were further divided into moderate (0.5~1 pack/day) and heavy smoker (>1 pack/day) according to WHO classification. Blood sample was drawn for assessment of some liver function test, Aspartase amino transferase (AST), Alanine amino transferase (ALT), Alkaline phosphatase (ALP), serum total bilirubin and serum albumin.*

**Results:** *The results showed that there was statistically significant in AST, ALT, ALP, serum total bilirubin and serum albumin, (pvalue 0.00,0.00,0.00,0.00 and0.00) respectively, when compared to control group.*

**Conclusion:** *Cigarette smoking affects liver function regardless of number of Cigarette smoked per day and duration of smoking.*

**Key words:** cigarette smoking, liver enzyme, LFT.

## **INTRODUCTION**

There are many ingredients in tobacco smoke that cause many diseases in the body including, infection, cancers and heart disease. [1, 2] and every 6 minutes one person dies in the world due to smoking [3]. Cigarette contains over 4,000 chemicals, 200 of them are poisons, contains over 80 cause cancer include (CO, free radicals, nicotine, and tar) [4,5] most dangerous component are tar and Carbon monoxide. Tar contains chemicals carcinogens which deposits in lung. Also smoke produce CO which binds to HB retard carrying of oxygen and lead to hypoxia, lung cancer, kidney cancer, heart disease and stroke[6] . Cigarette smoke affects many organs. The liver is one of those organs that might be affected by smoking despite the fact that there is no direct contact between liver and smoking [7]. Liver is vital organ of vertebrates play many roles in the body such as: metabolism with numerous function including: regulation of glycogen storage, de composition of RBCS, plasma protein synthesis, hormone production and eliminate toxins from the body [8].To assess the liver function there are many tests which can be conducted inside clinical laboratory. Some of these tests are (AST, ALT, ALP, serum bilirubin and serum albumin) [9].The determination functions of liver must be done carefully and precise because these parameters can affected by external factor such as: environmental factor especially cigarette smoke [10]. Some recent studies were conducted on effect of cigarette smoking on albumin, liver enzymes (AST, ALT and ALP), and bilirubin in males' smoker [6].Many studies showed that effect of cigarette smoked in LFT caused significant increase in ( AST, ALT and ALP )also significant decrease in serum albumin and serum

total bilirubin [payamO husen2015,sanger najat abdul  
razaq2013 and Khaled salem alsalhen 2014 ].

## **MATERIALS AND METHODS**

Case control study was conducted among 100 Sudanese participant males aged between (25~60) years which randomly selected and duration range from (5~27)years. The participant were divided into two groups smoker (50 subject) and non smoker(50 subject).the patient which further divided into two group according to WHO classification of packed smoked per day into heavy smokers(25 subject) and moderate smoker(25 subject) . The questionnaire was fulfill, any person who have history of liver disease, D.M, alcohol abuse, obesity, medication such as: tetracycline, cholesterol lowering drugs (niacin), history of blood transfusion and family history of inherited disorder were excluded. Five ml of venous blood were drawn from each subject; the sample was placed in heparinized tube and centrifuged at 3000 rpm for 15 minute. Plasma levels of total bilirubin, ALP, AST, ALT and albumin were estimated in all sample by kits method on Biosystems automated analyzer in Al-riyan Company. Statistical evaluation was performed using the Microsoft office excel for windows 2007 and SPSS for windows version 16.

## **RESULTS**

The results showed that serum ALP, AST and ALT levels were significantly high (p value 0.00,0.00 and0.00)respectively, in both heavy and moderate smoker where compared with control. There was statistically significantly low (p value 0.00and0.00) respectively were observed in albumin and bilirubin in both moderate and heavy smoker group when compared with control. between smoker there is no significant difference in(AST, ALT, albumin, bilirubin and albumin).

**Table 1: showed the Mean±SD of serum AST, ALT, ALP, albumin and bilirubin levels for smokers compared to control group**

parameter	Control N=50	Smokers N=50	P value
AST in IU/L	18.54 ±3.94	58.86 ±8.1	.000
ALT in IU/L	15.70±4	56.70±8.4	.000
ALP in IU/L	100.66 ±14.7	163.56±13.6	.000
Albumin in g/dl	3.94±.23	3.15±.16	.000
Bilirubin in Mg/dl	.55±.2	.31±.12	.000
Age in years	39.1000 ±8.98	39.8000±7.95	.681

**Table 2: showed mean±sd duration of smoking in years in four group range(5~27)**

parameter	5-10	11-15	16-20	>20
VALID N	10	18	13	9
albumin	3.3±.14	3.1±.16	3±.14	3±.13
bilirubin	.4±.09	.28±.12	.28±.11	.28±.13
ALT	54±8.6	59±9	59±7	56±6.9
AST	53±8	62±9	62±6.8	61±4.6
ALP	155±7.6	165±12	165±16	170±13

**Table 3: showed the mean±sd compared between two smokers group**

parameter	heavy	moderate	P value
age	40.3200±7.7	39.2800±8.2	.649
AST	59.3±8.7	58.40±7.7	.696
ALT	57.3±8.9	56±8.1	.610
ALP	164.4±14.8	162.64±12.4	.637
albumin	3.11±.14	3.2±.16	.066
bilirubin	.3±.1	.32±.13	.653

## DISCUSSION

The results showed a significant rise in serum AST, ALT and ALP. (P valu0.00,0.00 and0.00)respectively activity in cigarette smokers when compared to control group. These agree with [Payam O Husen 2015, Khaled Salem alsalhen2014 and Sangar Najat Abdul Razaq 2013]. These may be due to excessive

production of reactive chemicals that exceed body to eliminate it. The result showed there were no statistically significant in AST, ALT,ALP, albumin and bilirubin(p value .69,.61,.63,.06 and .63)respectively between moderate and heavy smoker non of above study compared between smoker group. in this study demonstrated that smoking associated with significantly lower concentrations of bilirubin levels and serum albumin (pvalue 0.00 and 0.00) respectively, these agrees with [Payam O Husen 2015, Khaled Salem Alsahen 2014 and Sangar Najat Abdul Razaq 2013] in two groups of smokers when compared to control. There may be dietary effect on albumin synthesis since smoker have been consumed low protein in diet than non smoker. [10].

## **CONCLUSION**

Cigarette smoking can affect liver functions and efficiency through its effect on serum ALP, AST, ALT and bilirubin.

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