

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قال الله تعالى :

رُفِعُ دَرَجَاتٍ مِّنْ نَّشَأٍ وَفَوْقَ كُلِّ ذِي عِلْمٍ عَلِيمٌ

صدق الله العظيم

سورة يوسف (الآية 76)

Dedication

To my mother

Who lactating me the meaning of the patience and loyalty.

To my father

Who teaches me the meaning of the given.

To my sisters .

To the candles of science and acknowledgment .

My teachers.

To my friends who are sharing me in the road.

Acknowledgment

I thank god first and foremost to give me the health and strength until it reached this stage. With great deal of respect I would like to thank Dr. Mariam Abbas Ibrahim my supervisor for her encouragement, supervision, time, patience, effort, critical comment and invaluable sound advice and support and careful guidance.

A great dept owe to laboratory staff of Turkish hospital, Dr. Yasmine for kind help.

Thank to volunteers who were enrolled in this study, Also I would like to thank who contributed to or participated with me in this research.

Finally I would to thanks all colleague , all my friend and every member of my family who have precious me , and who supported me financially or morally.

Abstract

Tobacco use is widely spread throughout the world. The effects of smoking on human health are serious and in many cases, deadly.

This is a case control study conducted during period from February to April 2015 to measure AST, ALT, ALP and GGT activities between smokers and non smokers.

Seventy smokers were selected as test group and 50 non smoker as control group (age was matched (17-65)). Blood specimens collected from both groups, and serum AST, ALT, ALP and GGT activities were determined by using autoanalyzer (Mindary).

A significant increase in means of serum AST, ALT, ALP and GGT activity in smoker when compared to control group, P. value = (0.000), (0.000), (0.01), (0.001) respectively .

The results also showed a significant positive correlation between age and serum AST, ALT and GGT activity (Serum AST activity $P=0.002$, $r=0.369$), (Serum ALT activity $P=0.000$, $r=0.325$) and (Serum GGT activity $P=0.002$, $r=0.275$). On the other hand there were no correlation between ALP and age ($P=0.859$, $r=-0.016$).

Statistical analysis also showed a significant positive correlation between duration of smoking and serum AST, ALT, ALP and GGT activity (serum AST activity $P=0.000$, $r=0.476$), (serum ALT activity $P=0.000$, $r=0.498$), (serum ALP activity $P=0.016$, $r=0.287$) and (serum GGT activity $P=0.002$, $r=0.362$).

Results also showed significant positive correlation between number of cigarettes per day and serum AST, ALP and ALT activity (Serum AST activity

P=0.011, $r=0.304$), (serum ALT activity P=0.002, $r = 0.369$) and (serum ALP activity P=0.05, $r = 0.231$) .There were no correlation between GGT and number of cigarettes smoked per day (serum GGT activity P=.207, $r =0.153$).

The study results revealed that smoking habit leads to significant elevation of serum AST, ALT, ALP and GGT compared to non smokers.

Increases in AST,ALT ,ALP and GGT is proportional with duration of smoking per years , also The serum AST,ALT, and GGT activities are showed significant positive correlation with age , and there was were no correlation between ALP with age . Serum AST, ALT, ALP and GGT activities are showed significant positive correlation with duration of smoking. Significant positive correlation between Serum AST, ALT, ALP activities and number of cigarettes was observed and there were no correlation between GGT activities and number of cigarettes smoked per day.

المستخلص

استخدام التبغ ينتشر على نطاق واسع في جميع أنحاء العالم . آثار التدخين على صحة الإنسان هي خطيرة وفي كثير من الحالات قاتلة.

اجريت هذه الدراسة المقطعية في الفتره ما بين يناير الى ابريل 2015 لقياس نشاط الاسبارتيت ترانس امينيز, الالنين ترانسامينيز, الالكلاين فوسفاتيزو و قاماجلوتاميل ترانسفيريز بين المدخنين وغير المدخنين .

تم اختيار 70 شخص من المدخنين (كمجموعة اختبار) و 50 شخص غير مدخن(كمجموعه ضابطه) , تم جمع عينات الدم من كل المجموعتين ,و تم قياس نشاط اللاسبارتيت ترانس امينيز, الالنين ترانسامينيز, الالكلاين فوسفاتيزو و قاماجلوتاميل ترانسفيريز باستخدام جهاز mindary.

اظهرت النتائج التحليل الاحصائي الى أن هناك زياده ذات دلالة احصائية في متوسط نشاط الاسبارتيت ترانس امينيز, الالنين ترانسامينيز, الالكلاين فوسفاتيزو و قاماجلوتاميل ترانسفيريز عند المدخنين مقارنة مع المجموعه الضابطه

القيمة المعنويه المطلقه = , (0.000), (0.000), (0.01), و(0.001) على التوالي.

ايضا اظهرت النتائج ان هناك علاقه ايجابيه ذات دلالة احصائية بين العمر و الاسبارتيت ترانس امينيز ($P=0.002, r=0.369$), الالنين ترانسامينيز ($P=0.000, r=0.325$), و قاماجلوتاميل ترانسفيريز ($P=0.002, r=0.275$), من ناحيه اخرى ليست لم يكن هناك علاقه ذات دلالة احصائية بين العمر و الالكلاين فوسفاتيز ($P=0.859, r=-0.016$).

أظهر التحليل الإحصائي ايضا وجود علاقة إيجابية ذات دلالة إحصائية بين مدة التدخين بالسنوات مع نشاط الاسبارتيت ترانسامينيز ($P=0.000, r=0.476$), الالنين ترانسامينيز ($P=0.000, r=0.498$), الالكلاين فوسفاتيزو ($P=0.016, r=0.287$), و قاماجلوتاميل ترانسفيريز ($P=0.002, r=0.362$).

وايضا اظهرت النتائج ان هناك علاقه ايجابيه ذات دلالة احصائية بين عدد السجارات في اليوم و نشاط الاسبارتيت ترانس امينيز ($P=0.011, r=0.304$), الالنين ترانسامينيز ($P=0.002, r=0.369$), و الالكلاين فوسفاتيزو ($P=0.05, r=0.231$). وليس هناك علاقه ذات دلالة احصائية بين عدد السجارات في اليوم و نشاط القاماجلوتاميل ترانسفيريز ($P=0.207, r=0.153$).

اظهرت نتائج الدراسة أن عادة التدخين تسبب ارتفاع كبير في نشاط الاسبارتيت ترانس امينيز, الالنين ترانسامينيز, الالكلاين فوسفاتيزو و قاماجلوتاميل ترانسفيريز بين المدخنين وغير المدخنين .

الزيادة في نشاط الاسبارتيت ترانس امينيز, الالنين ترانسامينيز, الالكلاين فوسفاتيزو و قاماجلوتاميل ترانسفيريز تتناسب مع مدة التدخين بالسنوات ، ايضا اظهرت وجود علاقة إيجابية بين نشاط الاسبارتيت ترانس امينيز, الالنين ترانسامينيز و قاماجلوتاميل ترانسفيريز مع التقدم في السن ، وليس هناك علاقة بين الالكلاين فوسفاتيز و التقدم في السن. وان هناك علاقته ذات دلالة احصائية بين نشاط الاسبارتيت ترانس امينيز, الالنين ترانسامينيز, الالكلاين فوسفاتيز و عدد السجارات في اليوم ، وليس هناك علاقة بين نشاط قاماجلوتاميل ترانسفيريز وعدد مرات التدخين في اليوم.

Table of contents

Subject	Page number
الايه	I
Dedication	II
Acknowledgment	III
Abstract English	IV
Abstract Arabic	VI
Contents	VIII
List of figures	X
Abbreviations	XI
<i>Chapter one (introduction and Literature review)</i>	
1.1 Introduction	2
1.2.1 Smoking	4
1.2.1.1 Physiology of smoking	5
1.2.1.2. Health effect of smoking	6
1.2.1.3 Physical and biochemical properties of cigarette smoke	7
1.2.1.4 Tobacco smoke constituents	8
1.2.2 The liver.	10
1.2.2.1 Liver Physiology.	12
1.2.2.2. Liver disorders.	14
1.2.2.3. Liver function test	15
1.2.2.4. Liver enzymes	15
1.3. Rationale	20
1.4 objective	21
<i>Chapter two (Materials and Methods)</i>	
2.1. Materials	23
2.1.1. Study design	23
2.1.2. Study area	23
2.1.3. Study population	23
2.1.4. Samples	23
2.1.5 Ethical consideration	23
2.1.6. Equipments	23

2.1.7. Data analysis	23
2.1.8. Quality control	24
2.2. Methods	24
2.2.1. Estimation of serum aspartate aminotransferase	24
2.2.2. Estimation of serum alanin aminotransferase	25
2.2.3 Estimation of serum alkaline phosphatase	26
2.2.4. Estimation of serum gamma-glutamyltransferase	28
<i>Chapter three(Results)</i>	
3. Results	30
<i>Chapter four (Discussion, conclusion and recommendations)</i>	
4.1. Discussion	46
4.2. Conclusion	48
4.3 Recommendations	49
References	51
Appendices	58

List of figures

Figure number	Page number
Figure 3.1 shows correlation between AST activity and duration of smoking among Sudanese smokers.	33
Figure 3.2 shows correlation between AST activity and number of cigarette per day among Sudanese smokers.	34
Figure 3.3 shows correlation between AST activity and age among Sudanese smokers.	35
Figure 3.4 shows correlation between ALT activity and number of cigarette per day among Sudanese smokers.	36
Figure 3.5 shows correlation between ALT activity and age among Sudanese smokers.	37
Figure 3.6 shows correlation between ALT activity and duration of smoking among Sudanese smokers	38
Figure 3.7 shows correlation between ALP activity and duration of smoking among Sudanese smokers	39
Figure 3.8 shows correlation between ALP activity and number of cigarette per day among Sudanese smokers	40
Figure 3.9 shows correlation between ALP activity and age among Sudanese smokers	41
Figure 3.10 shows correlation between GGT activity and AGE among Sudanese smokers	42
Figure 3.11 shows correlation between GGT activity and age among Sudanese smokers	43
Figure 3.12 shows correlation between GGT activity and duration of smoking among Sudanese smokers	44

Abbreviations

ALP: Alkaline Phosphatase.

ALT: Alanin Aminotransferase.

AMI: Acute Myocardial Infarction.

AST: Aspartate Aminotransferase.

cAST: cytoplasmic Aspartate Aminotransferase.

Co: Carbon Monoxide

COPD: Chronic Obstructive Pulmonary Disease.

DNA: Deoxy Nucleic Acid.

GGT: Gama-Glutamyltransferase.

LD: lactate dehydrogenase.

mAST: Mitochondrial Aspartate Aminotransferase.

NAD: Nicotine Amid Di Nucleotide .

NADH: Reduced Nicotine Amid Di Nucleotide

PAH's: Polycyclic aromatic hydrocarbons

PLP: pyridoxal phosphate.

RPM: Round Per Minutes.

URL: Upper Reference limit.

US: United State.

SS