Original Article

Influence of Alcohol and Smoking on the Lipid Profile and Related Biochemical Parameters in Iraqi Males

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Abstract

Background: Alcoholism has been one of the continuing problems for centuries due to its great harm to various organs of the body, especially if it is accompanied by the harmful phenomenon of smoking. **Objectives:** To determine the extent to which the lipid profile (cholesterol, triglycerides, high-density lipoprotein [HDL], very low-density lipoprotein [VLDL] and low-density lipoprotein [LDL]), Hb, packed cell volume (PCV), erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and white blood cell (WBC) are affected by the harms of smoking and alcohol consumption among Iraqi males. **Materials and Methods:** We chose about 120 men within the same age range (30–70) years, divided into four collections (C2, C3, C4 and C5) each collection consisting of 24 volunteers in addition to the natural collection C1 (also consists of 24 men who didn't smoke cigarettes and did not abuse alcohol). Blood samples were drawn from the volunteers' veins and used for biochemical analysis of their lipid profile and other specified biomarkers. **Results:** We conclude that alcohol abuse and smoking cigarettes cause high cholesterol, triglycerides, VLDL, LDL, and low HDL value. Also, alcohol abuse and smoking cigarettes cause a rise in CRP, WBC, Hb, and PCV but lower ESR value. **Conclusion:** Advertisements must be made to learn humans about the dangers of consuming alcohol and smoking cigarettes on an ongoing basis and in large quantities.

Keywords: Alcohol consumption, CRP, inflammation, lipid profile, smoking

Introduction

Today, globally, more than five million people die annually due to smoking, and recent studies indicate that the number of deaths will increase to more than eight million annually by the year 2030.[1-4]

Smoking and alcohol abuse cause immune weakness in the human body, which makes it easier to contract other diseases, such as cancer, various heart diseases, and strokes.[5-8] The negative impact of smoking and alcohol abuse on human immunity and lipid profile is very similar to the negative immune effects of chronic diseases, such as the effect of diabetes and COVID-19 virus.[9]

Alcohol addiction is considered one of the most serious problems facing the world financially, health-wise, and socially because it has harmful effects on the human body.[8,10-15]

Alcoholism has been a continuing problem for centuries due to its great harm to various organs of the body, especially if it is accompanied by the harmful phenomenon of smoking, which affects the functions of the liver, kidneys, heart, and other important organs of the body.[16-21]

Smoking causes many infections, such as inflammation of the lungs, respiratory system, and joints, because cigarettes contain many poisonous and carcinogenic materials, in addition to containing many harmful free radicals that attack cells, causing inflammation.[22,23]

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Our current study examined the effect of alcohol abuse and cigarette smoking on some selected biochemical parameters among Iraqi male volunteers.

Materials and Methods

Study population

We chose 120 men within the same age range; 24 of them are men who do not smoke or drink alcohol and at the same time do not suffer from any disease. The research was conducted from February 2021 to July 2023. Venous blood was drawn from the men, and lipid profile, inflammatory markers (C-reactive protein and white blood cell), viscosity, and hemoglobin were measured for all collections. The blood was separated by a centrifuge to obtain the men's serum blood samples, and then the lipid percentage and the rest of the variables mentioned above were measured. We divided the rest of the men as follows:

Subjects

The ages of the people included in our study range from 30 to 70 years, divided into four collections, each consisting of 24 patients:

Control collection: Men who didn't smoke cigarettes or abuse alcohol.
Collection 1: Men who abused few alcohol and did not smoke.
Collection 2: Men who abuse few alcohol and smoked occasionally.
Collection 3: Men who smoked too much and had moderate alcohol abuse.
Collection 4: Men with heavy alcohol consumption and smoking.

Statistical analysis

The values were taken from the results we obtained, entered into statistical tables, and displayed in the form of statistical graphs according to the program (SPSS). The values of the biochemical analysis results for the vital variables of the four groups were recorded and compared to the control collection. All values were then entered into the Excel program, adjusted, and subsequently entered into the statistical program Statistical Package for the Social Sciences version 20 (SPSS Inc, Chicago, IL, USA) for statistical analysis. Illustrative data analysis was conducted and presented, using measures of indecision and percentage ratios. The *P* value ($P \leq 0.01$) was applied to determine statistical significance.

Ethical approval

Ethical approval was obtained from the local ethics committee after obtaining the patient's verbal consent and according to the consent document number 422 on March 22, 2024.

Results

In this research, the study was conducted on 120 male volunteers at the Ramadi Teaching Hospital, and it showed the extent of the noticeable effect of both smoking and alcohol consumption on the lipid profile and some indicators of inflammation for the four groups of volunteers, as mentioned above.

The impact of alcohol abuse and smoking on cholesterol among the four collections

Findings illustrated the mean ± SEM of cholesterol data were (180.43 ± 14.68, 203.73 ± 14.91, 280.16 ± 20.75, and 340.22 ± 18.62) for four collections (G2, G3, and G4 sequentially) compared with healthy collection 1 (control value was 145.18 ± 12.53) like illustrated in Figure 1. Also, the least significant difference (LSD)

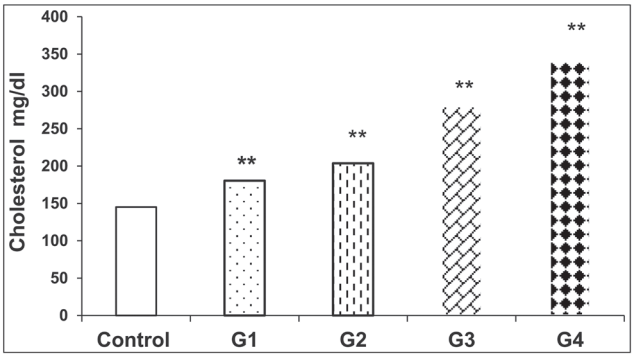

Figure 1: Data clarifies the average ± SEM of cholesterol for four collections as compared to the healthy collection (control)

Table 1: The mean ± SEM of cholesterol, LSD, and *P* value for four collections as comparison to the healthy collection (control)

Parameter	Control	G1: Men who abused few alcohol and did not smoke	G2: Men who abuse few alcohol and smoked occasionally	G3: Men who smoked too much and had moderate alcohol abuse	G4: Men with heavy alcohol consumption and smoking
Cholesterol (mg/dl)	145.18 ± 12.53	180.43 ± 14.68	203.73 ± 14.91	280.16 ± 20.75	340.22 ± 18.62
Least significant difference value			51.74 **		
P value			≤0.01**		

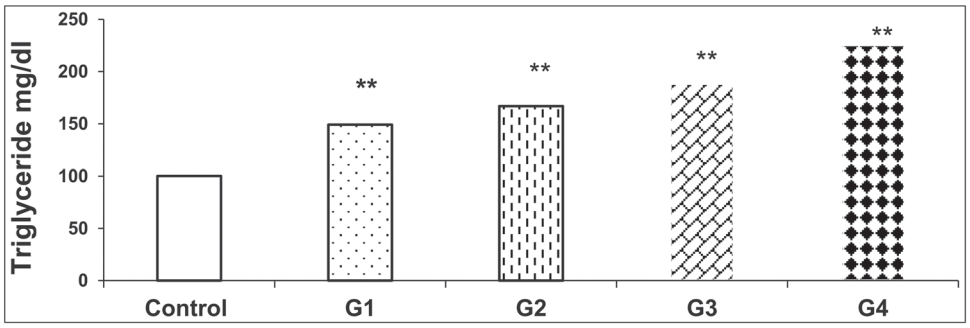

Figure 2: Data clarifies the average ± SEM of triglyceride for four collections as comparison to the healthy collection (control)

Table 2: The mean ± SEM of triglyceride, LSD, and *P* value for four collections in comparison to the healthy collection (control)

Parameter	Mean ± SD				
	Control	G1: Men who abused few alcohol and did not smoke	G2: Men who abuse few alcohol and smoked occasionally	G3: Men who smoked too much and had moderate alcohol abuse	G4: Men with heavy alcohol consumption and smoking
Tri. (mg/dl)	100.20 ± 7.87	149.12 ± 8.35	47.93 ± 2.69	44.53 ± 2.98	42.13 ± 2.67
Least significant difference value			45.66**		
P value			≤0.01**		

value (51.74**) and *P* value (≤0.01**) are presented in Table 1.

The impact of alcohol abuse and smoking on triglycerides among the four collections

Findings illustrated the mean ± SEM of triglyceride data were (149.12 ± 8.35, 166.89 ± 9.41, 188.34 ± 16.58, and 225.36 ± 17.52) for four collections (G2, G3, and G4 sequentially) compared with healthy collection 1 (control value was 100.20 ± 7.87) like illustrated in Figure 2. Also, LSD value (45.66**) and *P* value (≤0.01**) are presented in Table 2.

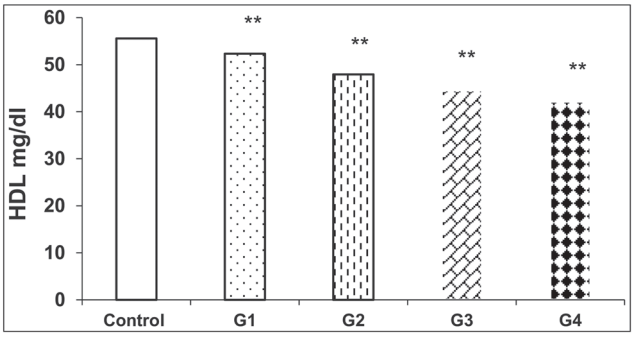

Figure 3: Data clarifies the average ± SEM of HDL for four collections in comparison to the healthy collection (control)

The impact of alcohol abuse and smoking on HDL among the four collections

Findings illustrated the mean ± SEM of high-density lipoprotein (HDL) data were (52.33 ± 3.27, 47.93 ± 2.69, 44.53 ± 2.98, and 42.13 ± 2.67) for four collections (G2, G3, and G4 sequentially) compared with healthy collection 1 (control value was 58.56 ± 3.48) as illustrated in Figure 3. Also, LSD value (6.05**) and *P* value (≤0.01**) are presented in Table 3.

The impact of alcohol abuse and smoking on VLDL among the four collections

Findings illustrated the mean ± SEM of very low-density lipoprotein (VLDL) data were (52.33 ± 3.27, 47.93 ± 2.69, 44.53 ± 2.98 and 42.13 ± 2.67) for four collections (G2, G3, and G4 sequentially) compared with healthy collection 1 (control value was 58.56 ± 3.48) like illustrated in Figure 4. Also, LSD value (6.05**) and *P* value (≤0.01**) are presented in Table 4.

The impact of abuse of alcohol and smoking on LDL among the four collections

Findings illustrated the mean ± SEM of low-density lipoprotein (LDL) data were (98.27 ± 5.63, 122.42 ± 7.92, 197.96 ± 13.57, and 259.02 ± 16.05) for four collections (G2, G3, and G4 sequentially) compared with healthy collection 1 (control value was 66.58 ± 5.12) like illustrated in Figure 5. Also, LSD value (6.05**) and *P* value (≤0.01**) are presented in Table 5.

The impact of abuse of alcohol and smoking on CRP among the four collections

Findings illustrated the mean ± SEM of C-reactive protein (CRP) data were (11.34 ± 0.72, 15.44 ± 0.96, 18.26 ± 0.78,

Table 3: The mean ± SEM of HDL, LSD, and *P* value for four collections in comparison to the healthy collection (control)

Parameter	Mean ± SD				
	Control	G1: Men who abused few alcohol and did not smoke	G2: Men who abuse few alcohol and smoked occasionally	G3: Men who smoked too much and had moderate alcohol abuse	G4: Men with heavy alcohol consumption and smoking
HDL (mg/dl)	58.56 ± 3.48	52.33 ± 3.27	47.93 ± 2.69	44.53 ± 2.98	42.13 ± 2.67
LSD value			6.05**		
P value			≤0.01**		

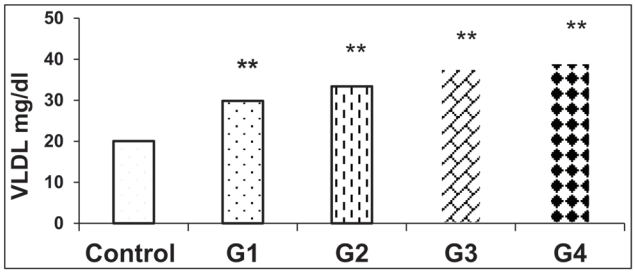

Figure 4: Data clarifies the average ± SEM of VLDL for four collections in comparison to the healthy collection (control)

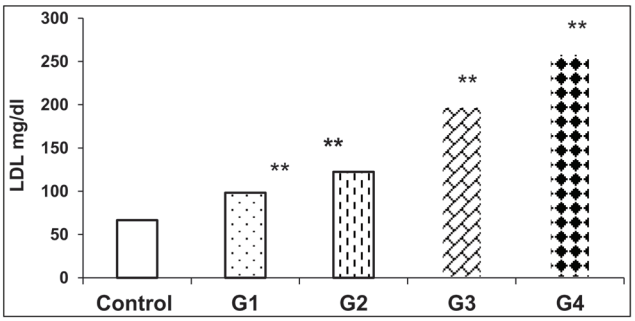

Figure 5: Data clarifies the average ± SEM of LDL for four collections in comparison to the healthy collection (control)

Table 4: The mean ± SEM of VLDL, LSD, and *P* value for four collections in comparison to the healthy collection (control)

Parameter	Mean ± SD				
	Control	G1: Men who abused few alcohol and did not smoke	G2: Men who abuse few alcohol and smoked occasionally	G3: Men who smoked too much and had moderate alcohol abuse	G4: Men with heavy alcohol consumption and smoking
VLDL (mg/dl)	20.04 ± 1.09	29.83 ± 2.16	33.38 ± 1.88	37.67 ± 2.15	39.07 ± 2.84
LSD value			7.52**		
P value			≤0.01**		

Table 5: The mean ± SEM of LDL, LSD, and *P* value for four collections in comparison to the healthy collection (control)

Parameter	Mean ± SD				
	Control	G1: Men who abused few alcohol and did not smoke	G2: Men who abuse few alcohol and smoked occasionally	G3: Men who smoked too much and had moderate alcohol abuse	G4: Men with heavy alcohol consumption and smoking
LDL (mg/dl)	66.58 ± 5.12	98.27 ± 5.63	122.42 ± 7.92	197.96 ± 13.57	259.02 ± 16.05
LSD value			58.64**		
P value			≤0.01**		

and 21.89 ± 1.44) for four collections (G2, G3, and G4 sequentially) compared with healthy collection 1 (control value was 7.16 ± 0.86) like illustrated in Figure 6. Also, LSD value (4.79**) and *P* value (≤0.01**) are presented in Table 6.

The impact of alcohol abuse and smoking on WBC among the four collections

Findings illustrated that the mean ± SEM of white blood cell (WBC) data were (7700 ± 153.08, 8100 ± 176.33, 9000 ± 161.27, and 8400 ± 172.30) for four collections (G2, G3, and G4 sequentially) compared with healthy collection 1 (control value was 5800 ± 127.34) like illustrated in Figure 7. Also, LSD value (761.3**) and *P* value (≤0.01**) are presented in Table 7.

The impact of abuse of alcohol and smoking on ESR among the four collections

Findings illustrated the mean ± SEM of erythrocyte sedimentation rate (ESR) data were (7.00 ± 0.36,

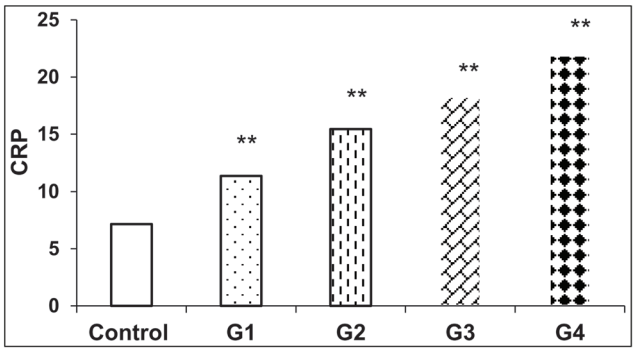

Figure 6: Data clarifies the average ± SEM of CRP for four collections as comparison to the healthy collection (control)

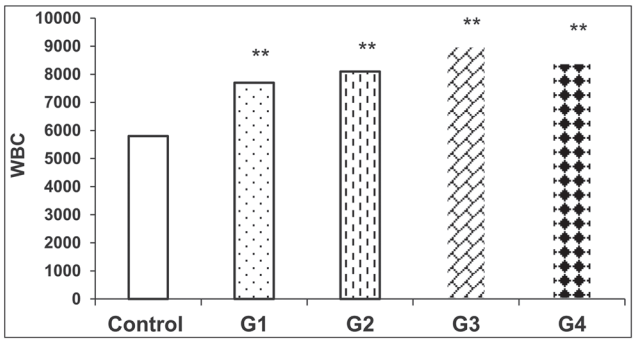

Figure 7: Data clarifies the average ± SEM of WBC for four collections in comparison to the healthy collection (control)

Table 6: The mean ± SEM of CRP, LSD, and *P* value for four collections in comparison to the healthy collection (control)

Parameter	Mean ± SD				
	Control	G1: Men who abused few alcohol and did not smoke	G2: Men who abuse few alcohol and smoked occasionally	G3: Men who smoked too much and had moderate alcohol abuse	G4: Men with heavy alcohol consumption and smoking
CRP (mg/l)	7.16 ± 0.86	11.34 ± 0.72	15.44 ± 0.96	18.26 ± 0.78	21.89 ± 1.44
LSD value			4.79**		
P value			≤0.01**		

Table 7: The mean ± SEM of WBC, LSD, and *P* value for four collections in comparison to the healthy collection (control)

Parameter	Mean ± SD				
	Control	G1: Men who abused few alcohol and did not smoke	G2: Men who abuse few alcohol and smoked occasionally	G3: Men who smoked too much and had moderate alcohol abuse	G4: Men with heavy alcohol consumption and smoking
WBC (cu/mm)	5800 ± 127.34	7700 ± 153.08	8100 ± 176.33	9000 ± 161.27	8400 ± 172.30
LSD value			761.3**		
P value			≤0.01**		

5.00 ± 0.34, 3.00 ± 0.25, and 2.00 ± 0.19) for four collections (G2, G3, and G4 sequentially) compared with healthy collection 1 (control value was 10.00 ± 0.42) like illustrated in Figure 8. Also, LSD value (3.40**) and *P* value (≤0.01**) are presented in Table 8.

The impact of alcohol abuse and smoking on Hb among the four collections

Findings illustrated the mean ± SEM of Hb data were (14.76 ± 1.02, 15.16 ± 1.14, 18.13 ± 1.47, and 16.40 ± 0.93) for four collections (G2, G3, and G4 sequentially) compared with the healthy collection 1 (control value was 14.0 ± 0.86) like illustrated in Figure 9. Also, LSD value (2.63**) and *P* value (≤0.01**) are presented in Table 9.

The impact of abuse of alcohol and smoking on PCV among the four collections

Findings illustrated that the mean ± SEM of packed cell volume (PCV) data were (45.30 ± 3.28, 47.50 ± 2.79,

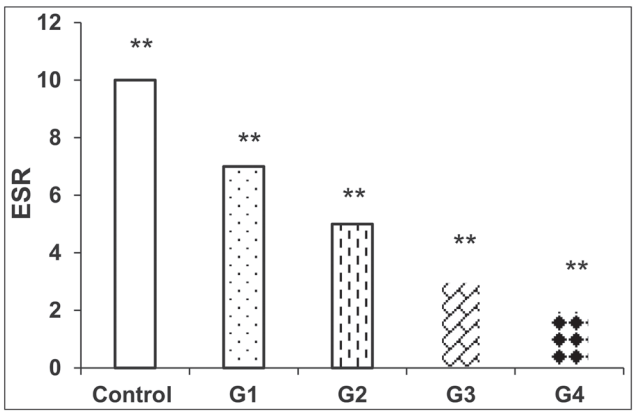

Figure 8: Data clarifies the average ± SEM of ESR for four collections in comparison to the healthy collection (control)

55.40 ± 3.61, and 51.10 ± 3.57) for four collections (G2, G3, and G4 sequentially) compared with the healthy collection 1 (control value was 43.00 ± 2.73) as illustrated

Table 8: The mean ± SEM of ESR, LSD, and *P* value for four collections in comparison to the healthy collection (control)

Parameter	Mean ± SD				
	Control	G1: Men who abused few alcohol and did not smoke	G2: Men who abuse few alcohol and smoked occasionally	G3: Men who smoked too much and had moderate alcohol abuse	G4: Men with heavy alcohol consumption and smoking
ESR (mm/1 h.)	10.00 ± 0.42	7.00 ± 0.36	5.00 ± 0.34	3.00 ± 0.25	2.00 ± 0.19
LSD value			3.40**		
P value			≤0.01**		

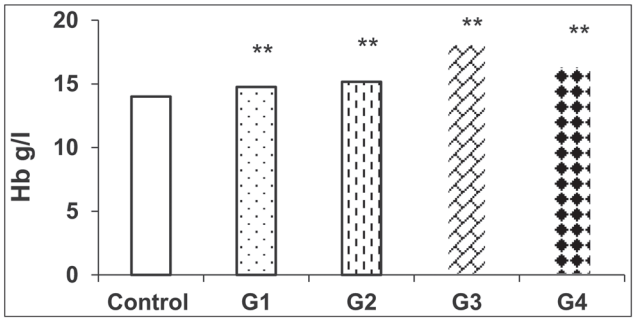

Figure 9: Data clarifies the average ± SEM of ESR for four collections in comparison to the healthy collection (control)

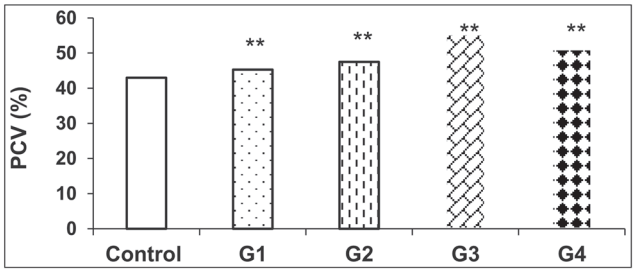

Figure 10: Data clarifies the average ± SEM of ESR for four collections in comparison to the healthy collection (control)

Table 9: The mean ± SEM of Hb, LSD, and *P* value for four collections in comparison to the healthy collection (control)

Parameter	Mean ± SD				
	Control	G1: Men who abused few alcohol and did not smoke	G2: Men who abuse few alcohol and smoked occasionally	G3: Men who smoked too much and had moderate alcohol abuse	G4: Men with heavy alcohol consumption and smoking
Hb (g/l)	14.0 ± 0.86	14.76 ± 1.02	15.16 ± 1.14	18.13 ± 1.47	16.40 ± 0.93
LSD value			2.63**		
P value			≤0.01**		

Table 10: The mean ± SEM of PCV%, LSD, and *P* value for four collections in comparison to the healthy collection (control)

Parameter	Mean ± SD				
	Control	G1: Men who abused few alcohol and did not smoke	G2: Men who abuse few alcohol and smoked occasionally	G3: Men who smoked too much and had moderate alcohol abuse	G4: Men with heavy alcohol consumption and smoking
PCV %	43.00 ± 2.73	45.30 ± 3.28	47.50 ± 2.79	55.40 ± 3.61	51.10 ± 3.57
LSD value			5.03**		
P value			≤0.01**		

in Figure 10. Also, LSD value (5.03**) and *P* value (≤0.01**) are presented in Table 10.

Discussion

Recently, studies indicated that the number of deaths will increase to more than eight million annually before the year 2030 due to alcohol abuse and continuous cigarette smoking in all different segments of society in countries of the world.[1-4]

This research, we noticed a significant affect alcohol abuse and cigarette smoking on the lipid profile of volunteer men, as shown in statistical values of Figures 1–5 and the statistical values of Tables 1–5, where Figure 1 and Table 1 show the increase in cholesterol values for the four different collections compared to the control collection. As is clear, the fourth collection has the highest value compared to the rest of the collections and the control collection, and the same increase is observed in triglycerides, VLDL, and LDL for the

fourth collection compared to the control collection. As for the beneficial HDL, on the contrary, as shown in Figure 3 and Table 3, the fourth collection has the lowest value compared to the remaining collections and the control collection, and these results support in other studies.[24-26]

These large increases in cholesterol and harmful triglycerides are due to smoking and alcohol abuse, we saw that clearly from *P* value (≤0.01**), and this is a danger to the life of alcoholic smokers, as it leads to the development of many heart diseases such as coronary artery disease, heart and blood vessel diseases.[8,27,28] A degrease in HDL (commonly known as the beneficial lipid), is strongly associated with an increased risk of heart diseases and may be life-threatening.[29]

The blood parameters that were measured in this research (CRP, WBC and ESR) are considered useful tools for measuring the extent of the effect of harmful substances found in alcohol and cigarettes on human blood,[30] where we notice an increase in the CRP value [Figure 6 and Table 6], and in WBC value this indicates the presence of strange material in the body which change the normal physiological procedure, as well as It may be an indication of inflammation due to foreign substances found in alcohol and cigarettes.[31]

Again in collection 3, we notice increase in WBC value more than in the rest of the collections, this indicates that smoking is the main reason for their increase, and this may be attributed to the glycoprotein found in tobacco leaves [Figure 7, Table 7]: This is consistent with what some scientists have found.[5]

The ESR also decreased [Figure 8] and [Table 8], while the values of both Hb and PCV increased, especially for the third collection compared to the rest of the collections and the control collection, with great importance ($P \leq 0.01$**). The reason may be due to the harmful substances in cigarettes that are deposited in the body, as this appears clear in the Figures 1, 2, 6 and 7 and Tables 9 and 10, respectively.[32-34]

Conclusion

We conclude that alcohol abuse and smoking cigarettes cause high cholesterol, triglycerides, VLDL and LDL, and low HDL value. Additionally, alcohol abuse and smoking cigarettes cause a rise to CRP, WBC, Hb, and PCV but lower ESR value. Therefore, advertisements must be made to educate people on the dangers of consuming alcohol and smoking cigarettes on an ongoing basis and in large quantities.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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