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EFFECTS OF SMOKING ON PROTEINS LEVEL IN SERA OF IRAQI CIGARETTE SMOKERS

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Abstract

Smoking is a chronic and progressive disease that is also communicable, causing harm to every organ of the body.

Material and method This study compared (17) narghile smokers to (18) non-smokers. After measuring total serum protein, albumin, globulins, and albumin/globulin ratio, SPSS was used to assess statistical differences between the two groups. All biochemical parameters were evaluated spectrophotometrically.

The results obtained show that total serum protein was significantly decreased in smokers (5.833±0.255) compared to the non-smokers (6.139±0.535). Insignificant decrease in albumin (3.824±0.354) concentration in smokers group compare to the non-smokers group (4.061±0.485), while no significant difference was noted in both groups (smokers and non-smokers) in globulins concentration (2.009±0.226 and 2.078±0.281, respectively). No significant differences between smokers and non-smokers group for A/G ratio, (1.941±0.379 and 1.994±0.420, respectively) were observed.

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Conclusion The current study showed that cigarette smoking lowers blood protein levels, therefore extended smoking may pose greater dangers**.**

Keywords: *Effects of Smoking, Proteins Level, Narghile Smokers.*

Introduction

Burning something and breathing in the smoke to taste and absorb it is called smoking. Usually, the component is dried tobacco leaves that have been folded into a little rice paper square to create a "cigarette". Smoking is usually employed for recreational drug use because burning dried plant leaves vaporizes and carries active substances into the lungs, where they are quickly absorbed into the circulation and reach physiological tissue. [1]

Cigarettes are by far the most popular smoking instrument, although other options include pipes, cigars, bidis, narghile, vaporizers, and bongs. The figure is 1.1. Cigarette smoking involves inhalation of heated aerosol and gas, which permits deep penetration of the lungs and subsequent absorption of the active compounds into the bloodstream; These particles and vapors include several chemicals, including the pharmacologically active alkaloid nicotine. Ritual smoking is also common in several cultures; its users aim to achieve a meditative state they call "spiritual enlightenment" by inducing a trance.

Because smoke inhalation disrupts physiologic functions like respiration, smoking is unhealthy. Compared to non-smokers, tobacco-related diseases kill half of long-term smokers. Smoking killed nearly five million people annually from 1990 to 2015 [2]. One common recreational drug usage is smoking. with more than a billion people, the majority of whom live in developing nations [3]. Cannabis and opium are hardly smoked. Heroin and other hard narcotics are rarely sold, therefore their use is limited. Rolling cigarettes from loose tobacco and rolling paper is possible, but industrial cigarettes are more common.

Narghile Bongs

Cigarette

Figure 1.1: The most common method of smoking.

Substances and Equipment Tobacco is smoked most often. Many tobacco varietals are mixed into many brands. Tobacco with fruit flavors is popular for hookahs. Cannabis, derived from Cannabis sativa or Cannabis indica flowers or leaves, is the second most smoked substance. The substance is prohibited in most nations and pseudo-legal in those that allow public consumption. However, a large majority of adults in nations.

Water pipes are ubiquitous and used for cannabis as bongs.

Instruments are needed for even basic smoking. As a result, there is now an enormous variety of smoking accessories available worldwide. You need fire and a container to light tobacco, cannabis, opium, or herbs. Most well-liked Today is that day. A cigarette is a paper tube that is firmly wrapped around a mild inhalant tobacco strain. The tobacco is usually hand-rolled with loose tobacco or made industrially with a filter. Cigars and pipes are common smoking tools.The other end of a lit cigarette is held in or near the mouth, when smoke is inhaled. One might use a cigarette holder [4].

Each tobacco variety has its own flavor and features, and its preparation affects its taste, smell, and pharmacological qualities. Cigarette producers add additives to tobacco to create an attractive and effective nicotine delivery mechanism. Tobacco smoke contains thousands of compounds, as seen in Table 1.1. All cigarettes carry nicotine to the lungs. Each cigarette puff rapidly absorbs nicotine into the bloodstream and delivers a high-meditation nicotine dose to the brain via arterial movement [1].

Table 1.1: Some of the substances a cigarette delivers into the body

Substances	Effects
Nicotine	addictive, not carcinogenic, limited or no cardiovascular risk at doses typically obtained by smokers
Carbon monoxide	probably increases cardiovascular risk
Benzo(a)pyrene	carcinogenic
Aromatic hydrocarbons	carcinogenic
Nitrosamines	carcinogenic
Additives	enhance 'flavor' and nicotine effects
Particulates	may carry acute risk of coronary thrombosis
Free radicals	ionized particles that may cause atherogenesis
Polonium	radioactive element that may cause cancer

More tobacco products pose a threat to health than cigarettes do. Cigarettes' principal psychoactive component, nicotine, has a significant potential for addiction. Cigarette smokers lose 14 years of their lives and half of them die from tobacco-related diseases [5]. Pregnancy-related cigarette use has been connected to low birth weight, fetal malformations, and early birth [6]. Many businesses and public spaces have banned smoking because second-hand smoke from cigarettes harms bystanders [7, 8]. The aerosol from cigarettes contains about 4,000 chemicals, including nicotine, carbon monoxide, acrolein, and others. More than 50 are carcinogenic [9, 10].

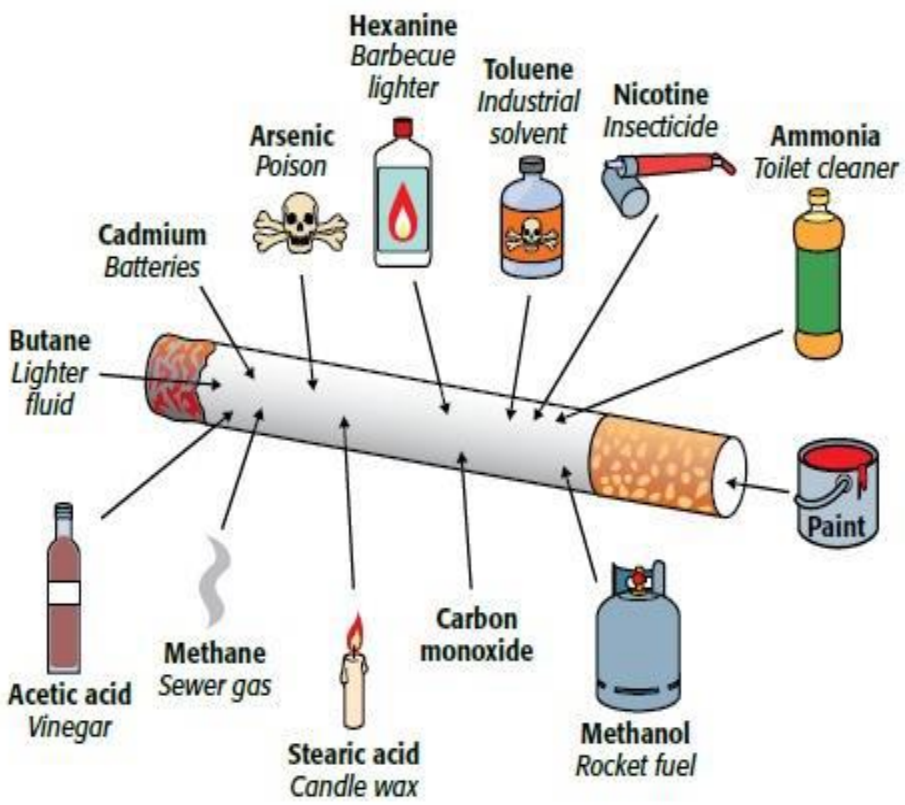

Figure 1.2: Some substances in cigarette.(5)

Proteins found in blood plasma are referred to as plasma proteins or serum proteins. The immune system and acellular activity are both controlled by them, and they transport lipids, hormones, vitamins, and minerals throughout the body. (11) Some of the other proteins found in blood are enzymes, components of complement, inhibitors of proteases, or precursors of kinin. It is commonly believed that hemoglobin is transported in blood serum, but in fact, it is red blood cells.(12)

Plasma osmotic pressure keeps lipids and steroid hormones moving. Serum albumin, which makes up 55% of blood proteins, does this. Globulins help the immune system work by moving ions, hormones, and fats around. They make up 38% of blood proteins.(13,14) For blood to clot, fibrinogen has to be changed into fibrin, which is not soluble and makes up 7% of blood proteins. Les hormones, enzymes, and proenzymes that control other proteins make up 1% of plasma proteins. Besides gamma globulins, the liver makes all the other proteins in the blood [15, 16].

A biochemical test called serum total protein (TP) measures serum protein levels [17].

Plasma protein is albumin and globulin. The globulin consists of α1, α2, β, and γ globulins. Protein electrophoresis can quantify these fractions, however the total protein test estimates all fractions faster and cheaper. The biuret reagent is used to measure total protein, however Kjeldahl, dye-binding, and refractometry are also available. Measurements are done using automated analyzers with other lab testing. Total protein is usually 60-80g/L. (Some sources quote "6.0-8.0 g/dl"), although this depends on the analysis method. Liver illness or

acute infection can lower albumin concentrations below the reference limit. Low total protein may indicate immunodeficiency rarely. Paraproteinaemia, Hodgkin's lymphoma, leukemia, and other immunoglobulin-causing conditions have high concentrations. In vertebrate blood, serum albumin (blood albumin) is a globular protein [18].

Humans' most prevalent blood protein is serum albumin, generated by the liver and dissolved in plasma. Albumin maintains oncotic pressure, which distributes body fluids between blood arteries and tissues. Without albumin, excessive blood vessel pressure would force more fluids into tissues. In addition to transporting hemin and fatty acids, it non-specifically binds numerous hydrophobic steroid hormones in plasma. 3.5–5 g/dl is the human serum albumin reference range. Most significant is the A/G ratio, typically ~ 1.2-1.5, which may decrease with persistent infections, liver illness, and neoplasm [19].

The aim of the study

This study examines how cigarette smoking affects serum protein levels in smokers and non-smokers.

Materials and Methods

This study included two groups of men, group (A) consisted of seventeen (17) smoker students and group (B) consisted of eighteen (18) non-smoker students. All candidates in both groups (A&B) are students in Chemistry Department, College of medicine , al nahrain University. All laboratory chemicals and reagents used in this research were of annular grade from the companies listed below:

Chemicals	Company
Copper sulfate pentahydrate, sodium potassium tartrate, sodium hydroxide, sodium chloride	BDH (England
Bovine serum albumin (BSA)	Fluka (Switzerland)
Albumin kit	Spinreact (Spain)

The instruments used in this research are as Balance, Bench Centrifuge and Spectrophotometer.

Table (2.1) shows the demographic data that were collected for both groups.

Table 2.1: Demographic data of the two studied groups (Mean±SD)

Characteristic	Smokers [n=17]	Non – smokers [n=18]
Gender	Male	Male
Age (year)	23.65 ± 3.90	23.00 ± 3.15
Method of Smoking	cigarette	------
Period of Smoking (year)	3.74 ± 2.37	--------
Number of Smoking (cigarette per day)	12.18 ± 7.89	-------
Medical History	-------	----------

Five milliliters of venous blood samples were collected from each of the subjects who participated in this investigation. After allowing the blood to coagulate in the serum tube at room temperature for five minutes, the blood was separated by centrifugation at a speed of three thousand revolutions per minute. The serum was extracted in order to measure the biochemical characteristics, and it was then stored at a temperature of -20 degrees Celsius until it was needed.**(24)**

Statistical analysis

The results in this study are presented as the standard deviation less or equal to the mean. Every statistical analysis was completed with the assistance of the SPSS software, version 16.0. At a significance threshold of $p \leq 0.05$, the Student T-Test was employed to ascertain the significance of the variation in mean values.

Results and Discussion

The biochemical parameters (total serum protein, albumins, and globulins) were measured in sera of both studied groups, then, albumin/globulin (A/G) ratio was calculated within the same groups.

This study compared non-smokers' blood levels to smokers' to assess all biochemical parameter alterations.

Total serum protein was significantly decreased in smokers (5.833±0.255) compared to the non-smokers (6.139±0.535), as shown in Figure (3.1). Figure 3.2 showed insignificant decrease in albumin (3.824±0.354) concentration in smokers group compare to the non-smokers group (4.061±0.485), while no significant difference was noted in both groups (smokers and non-smokers) in globulin concentration (2.009±0.226 and 2.078±0.281,

respectively), Figure 3.3. No significant difference between smokers and non-smokers group were observed for A/G ratio, (1.941±0.379 and 1.994±0.420, respectively) (Figure 3.4).

Alsalhen and Abdalsalam [21] found that, in comparison to non-smokers, smoking decreased the plasma levels of total protein, albumin, and globulin. According to the results of the current study, smokers' plasma MDA concentrations are higher than non-smokers'. Elevated levels of AST, ALT, and ALP were linked to heavy smoking, along with low levels of albumin, globulin, and total protein. All smokers had considerably higher levels of triglycerides and cholesterol than non-smokers.

(PDF) A comparison of smokers and non-smokers on the impact of cigarette smoking on liver functioning

In a previous study, Abdul-Razaq and Ahmed [22] According to the study, the heavy and moderate smoker groups' serum concentrations of albumin, globulin, and total protein were significantly lower than those of the nonsmoking group. But when the serum A/G ratio was compared between the smoker and non-smoking groups, no statistically significant differences were seen. Smoking may impede the effectiveness and activities of the liver. Exposure dosage determines these kinds of impacts.

The decreased level of albumin in smokers in comparison with non-smokers may be because albumin, an extracellular antioxidant, accounts for up to 49% of plasma antioxidant status [23]. Albumin transports and stores many ligands to maintain plasma osmotic pressure and provide endogenous amino acids, so cigarette smokers' albumin functions will be lower than non-smokers'. Protein profile research requires additional smokers, varied ages, types of smoking, and other biochemical factors.

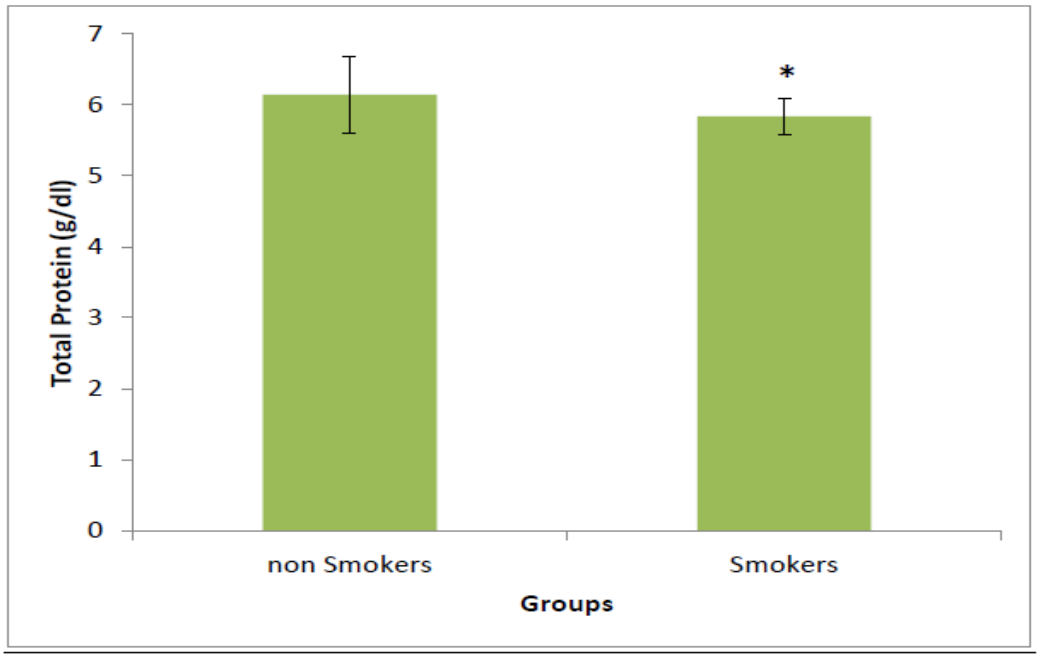

Figure 3.1: Total Protein concentration in smokers and non-smokers.

Data are expressed as mean ± SD. * Represents significant at *P*≤0.05.

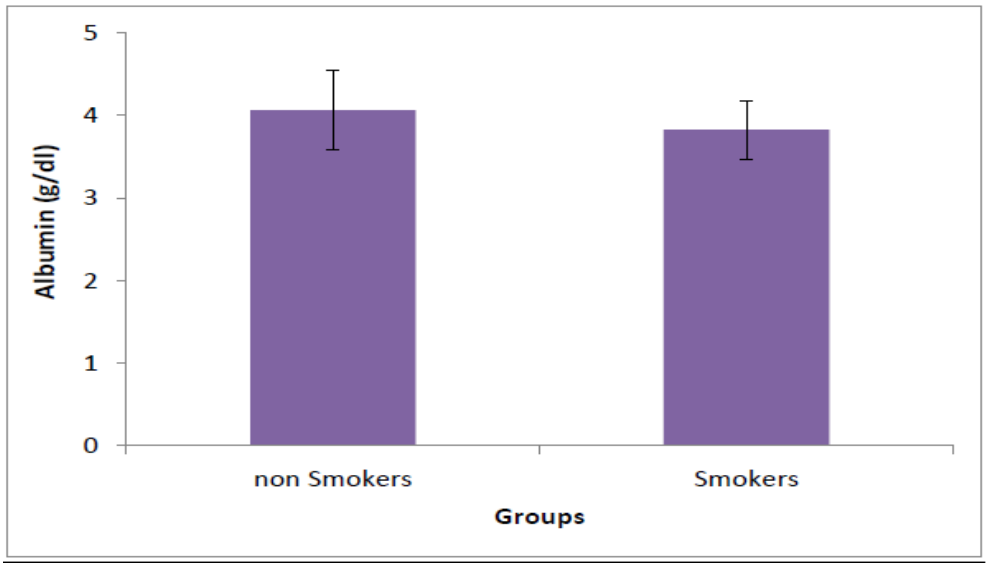

Figure 3.2: Albumin concentration in smokers and non-smokers.

Data are expressed as mean ± SD.

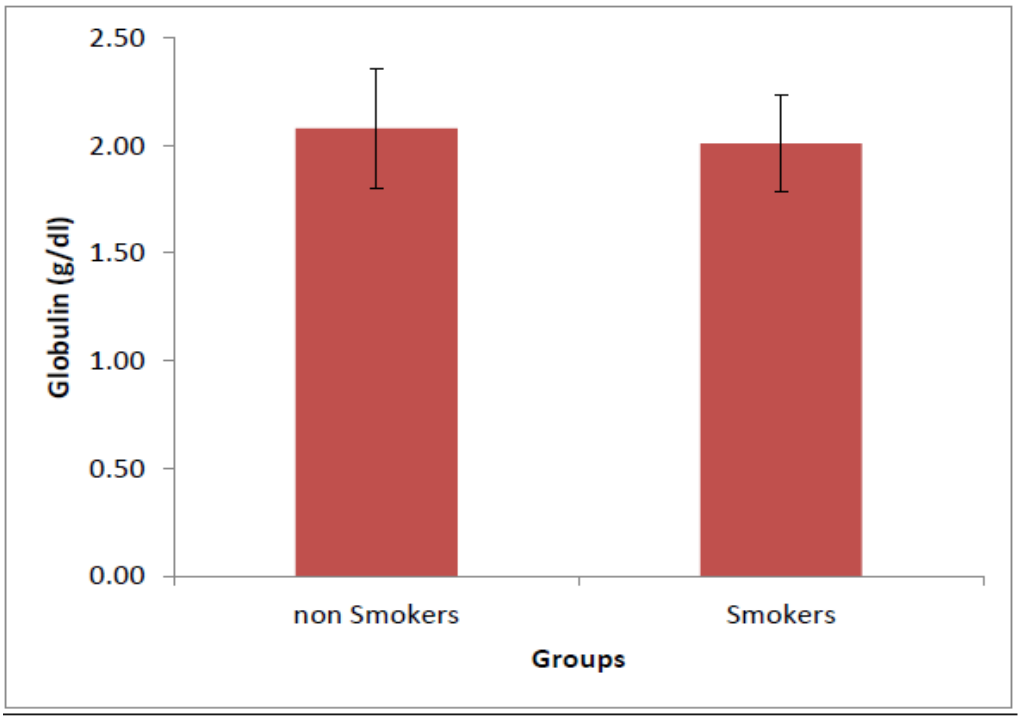

Figure 3.3: Globulins concentration in smokers and non-smokers.

Data are expressed as mean ± SD.

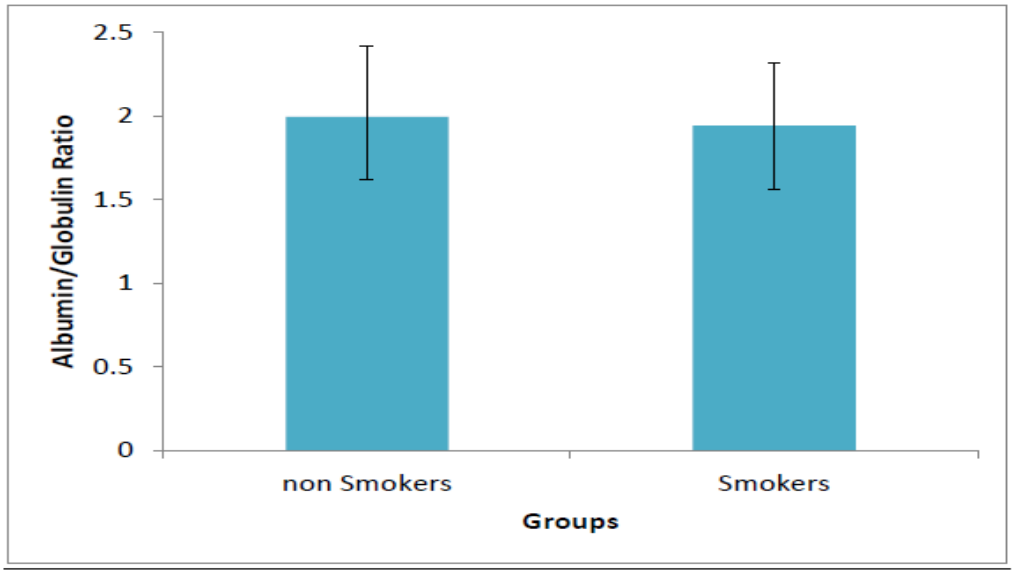

Figure 3.4: Albumin/Globulin ratio in smokers and non-smokers.

Data are expressed as mean ± SD

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