Research Article

BIOMEDICAL Journal of Scientific & Technical Research

ISSN: 2574 -1241

DOI: 10.26717/BJSTR.2022.47.007533

Caffeinated and Decaffeinated Coffee Have Different Effects on Weight, Sleeplessness, and Blood Pressure

Raghad AlShoqiran[1] and Noorah Saleh Al-Sowayan[2]*

[1]*Master Student in Biology Department, College of Science, Qassim University, Saudi Arabia*

[2]*Department of Biology, College of Science, Qassim University, Saudi Arabia*

***Corresponding author:** Noorah Saleh Al-Sowayan, Department of Biology, College of Science, Qassim University, Saudi Arabia

ARTICLE INFO

Received: December 05, 2022

Published: December 15, 2022

Citation: Raghad AlShoqiran and Noorah Saleh Al-Sowayan. Caffeinated and Decaffeinated Coffee Have Different Effects on Weight, Sleeplessness, and Blood Pressure. Biomed J Sci & Tech Res 47(4)-2022. BJSTR. MS.ID.007533.

ABSTRACT

The majority of people nowadays drink coffee in some form or another in the morning. Coffee includes chlorogenic acid, which inhibits the formation of new fat cells and reduces the generation of glucose in the body, aiding weight loss and lowering BMI and body fat. What effect does caffeine have on the human body? Is the effect on weight and body mass, sleeplessness and blood pressure, and heart rate favorable or negative if there is one?.

Methodology and Materials: In this study, a test was performed to measure the effect of caffeine on volunteers. And their number was 20 volunteers, who did not suffer from any diseases. They were given two types of coffee: the high-caffeinated coffee was Turkish coffee, and the decaffeinated coffee was Arabic coffee, and it was (400 mg) and the duration of the experiment was 14 days.

Results: Our results in this study were that there was no difference between high caffeine content in coffee and decaffeinated coffee on weight, body mass, insomnia and blood pressure.

Conclusion: There was no effect on healthy people if they drank coffee at a rate of 400 mg per day, because it is a safe dose. Also, coffee, whether it is caffeinated or decaffeinated, does not affect weight and insomnia and blood pressure.

Keywords: Body Mass; Turkish Coffee; Heart Rate; Blood Sugar; Arabic Coffee

Introduction

With a global trade volume of more than ten billion dollars, coffee is the most popular beverage on the globe after water. There will be arguments over its benefits and risks as long as reliable evidence remains to support its health-promoting potential (Butt, et al. [1]). The outer shell of the coffee bean is normally immature in green. The ripe fruits are scarlet, with a soft, delicious pulp inside. The silvery skin that covers each hemisphere of the green coffee bean is then followed by a very sticky and moist layer of mucilage (the pectin layer) and ultimately the pectin layer (Iriondo-DeHond & Castillo [2]). Caffeine is a psychotropic stimulant molecule that is commonly used in coffee. It's widely used to aid persons with behavioral and cognitive issues caused by sleep deprivation. Caffeine consumption has been associated to improved performance in healthy persons, even at modest doses of 32 mg. Coffee has received special attention in the past decade, as many health benefits have been found to be associated with its consumption (Chaudhary, et al. [3]). Turkish coffee was used in this study, Turkish coffee is a mildly roasted and finely ground blend of high quality Arabica coffee beans originating from Brazil and Central America. Turkish coffee is distinguished from other coffees by the manner it is made. Because of a novel preparation process established by the Turkish people, where it is cooked in copper coffee pots, this coffee is known as

Turkish coffee. Turkish coffee, which has been synonymous with the Turks' cultural and social past, has been an indispensible element of their cultural and social history.

According to studies, coffee drinkers had a lower BMI than non-coffee drinkers, and epidemiological evidence links coffee and/or caffeine consumption to long-term weight gain (Gavrieli, et al. [4]). Sleep problems are quite common in today's culture and are linked to major psychological, societal, and economic costs, despite the fact that they are routinely misdiagnosed and undertreated. Sleep deprivation has been linked to obesity, high blood pressure, and diabetes. Insomnia is the most common sleep disorder, characterized by difficulty falling asleep, remaining asleep, or waking up early in the morning, resulting in daytime impairments (Kashyap, et al. 2014). In previous studies, insomnia symptoms were connected to both caffeine use and improper sleep length, and the association between coffee consumption and normal blood pressure was also extensively investigated (Chaudhary, et al. [5]). In recent decades, the acute and chronic cardiovascular effects of coffee and caffeine on the cardiovascular system have been a source of debate, with the acute effects including an elevation in blood pressure and. Chronic coffee intake, on the other hand, has been linked to an increased risk of cardiovascular disease, while current research suggests that when drank in moderation and over time, it has a generally favorable effect (de Oliveira, et al. [6]).

Methods and Materials

In this study, 20 volunteers were collected, including 4 males and 16 healthy females who agreed to the experiment and signed the informed consent, their ages ranged between (18-53) years and their average weight was (58.7) kg. A scale was used to measure weights, BMI, BMR & Body Fat Calculator program to measure body mass, Omoron M7 to measure blood pressure and heart rate, and Contour Next BGM to measure blood sugar, and questionnaire questions were answered for insomnia (Chaudhary, et al. [5]). At the beginning of the experiment, the volunteers were divided into two parts. The first part consists of 10 healthy people from the control group, which is the group that is not affected by doses. The other part also consists of 10 healthy people, which is the group that is being studied. Before starting the experiment, weight measurements were taken. Blood pressure, blood sugar, heart rate measurement, volunteers were in a fasting state and the last dose of caffeine was 10 hours ago. In the first week of the experiment, volunteers were prevented from consuming any dose of caffeine / coffee / tea, and volunteers were given a dose of Arabic coffee (decaffeinated). by 99.7%) and the dose was equal to 400 mg (24 g of coffee and 400 mg of water) (Smits, et al. [7]).after the end of the first week the measurement of blood pressure, heart rate and blood sugar was taken after the last dose approximately after 90 minutes (Smits, et al. [7]) .and the weight was measured a day later and only find and be the volunteer In the case of hunger before eating any food or drink and insomnia questionnaire questions were answered in the dose of decaffeinated coffee. In the second week, volunteers were given a high dose of caffeine (Turkish coffee) equivalent in one cup from 160-240 (Afifi, et al. [8]). in one cup only (200) mg. The volunteers were given two cups of Turkish coffee a day, equivalent to 400 mg [1].

Also, during the experiment, the volunteers ate chocolate equivalent to approximately 16 g. The volunteers were given this rate of doses because it is a safe dose and gives better results. The same measurements were measured in the first week, specifically in the evening between 6 and 11 at night, and the study period was 14 days, equivalent to two weeks. After obtaining the results, Data analysis: IBM SPSS Statistics for Windows, version 23 was used to analyses the data, which was expressed as mean +/- standard error of mean (IBM SPSS, IBM Corp., Armonk, N.Y., USA). The Shapiro–Wilk test was employed to determine whether the data distribution was normal. To calculate significance, a one-way ANOVA test followed by Tukey's test was used, assuming that the groups had identical variance and Mann Whitney test for abnormally distributed data. Statistical significance was defined as a P-value of less than 0.05. Graphs were made using Prism software graph pad version 5.

Results

There were insignificant changes in body weight between different studied groups (Table 1) and (Figure 1).

Data expressed as mean ± Standard error of mean. Significance between groups was made by One Way ANOVA test followed by Tukey's test. There were insignificant changes in body weight index between different studied groups (Table 2) and (Figure 2). Data expressed as mean ± Standard error of mean. Significance between groups was made by One Way ANOVA test followed by Tukey's test. Blood glucose in group 2 was significantly increased than group 1 ($P < 0.010$). Meanwhile, blood glucose level in groups 3 did not show any significant changes versus group 1 and group 2 (Table 3) and (Figure 3). Data expressed as mean ± Standard error of mean. Significance between groups was made by One Way ANOVA test followed by Tukey's test. There were insignificant changes in heart rate between different studied groups (Table 4) and (Figure 4). There were insignificant changes in SBP and DBPt between different studied groups (Table 5) and (Figure 5). Data expressed as mean ± Standard error of mean. Significance between groups was made by One Way ANOVA test followed by Tukey's test. There were insignificant changes in DFA, DSA and DS between different studied groups. Meanwhile, NRS was significantly lower in group 3 versus group 2 ($P < 0.050$), but there were insignificant changes in group 2 and group 3 versus group 1. (Table 6) and (Figure 6). Data expressed as mean ± Standard error of mean. Significance between groups was made by Mann Whitney test between each two groups as data was not normally distributed.

Table 1: Body weight (Kg) in different studied groups.

Parameter	Group 1	Group 2	Group 3
Body weight (kg)	58.74±3.02	55.47±3.67	55.62±3.70
Significance versus group 1	-	*P >0.050*	*P >0.050*
Significance versus group 2	-	-	*P >0.050*

Table 2: Body mass index (kg/m^2) in different studied groups.

Parameter	Group 1	Group 2	Group 3
Body mass index (kg/m2)	22.95±1.23	20.74±1.39	20.77±1.39
Significance versus group 1	-	*P* >0.050	*P* >0.050
Significance versus group 2	-	-	*P* >0.050

Table 3: Blood glucose (mg/dl) in different studied groups.

Parameter	Group 1	Group 2	Group 3
Blood glucose (mg/dl)	89.65±1.88	101.50±3.67	95.50±2.29
Significance versus group 1	-	*P* <0.010**	*P* >0.050
Significance versus group 2	-	-	*P* >0.050

Table 4: Heart rate (beats/min) in different studied groups.

Parameter	Group 1	Group 2	Group 3
Blood glucose (mg/dl)	86.75±2.21	87.10±1.49	86.60±2.98
Significance versus group 1	-	*P* >0.050	*P* >0.050
Significance versus group 2	-	-	*P* >0.050

Table 5: Blood pressure (mm/Hg) in different studied groups.

Parameter	Group 1	Group 2	Group 3
SBP (mm/Hg)	114.20±2.85	111.30±4.61	110.80±3.82
Significance versus group 1	-	*P* >0.050	*P* >0.050
Significance versus group 2	-	-	*P* >0.050
DBP (mm/Hg)	78.30±7.80	77.90±4.46	75.80±3.65
Significance versus group 1	-	*P* >0.050	*P* >0.050
Significance versus group 2	-	-	*P* >0.050

Table 6: Insomnia tests in different studied groups.

Parameter	Group 1	Group 2	Group 3
DFA	1.15±0.24	1.00±0.42	1.40±0.43
Significance versus group 1	-	*P* >0.050	*P* >0.050
Significance versus group 2	-	-	*P* >0.050
DSA	1.40±0.34	1.50±0.37	1.20±0.36
Significance versus group 1	-	*P* >0.050	*P* >0.050
Significance versus group 2	-	-	*P* >0.050
NRS	1.05±0.25	1.20±0.36	0.30±0.21
Significance versus group 1	-	*P* >0.050	*P* >0.050
Significance versus group 2	-	-	*P* <0.050*
DS	1.10±0.25	1.40±0.45	1.30±0.40
Significance versus group 1	-	*P* >0.050	*P* >0.050
Significance versus group 2	-	-	*P* >0.050

DOI: 10.26717/BJSTR.2022.47.007533

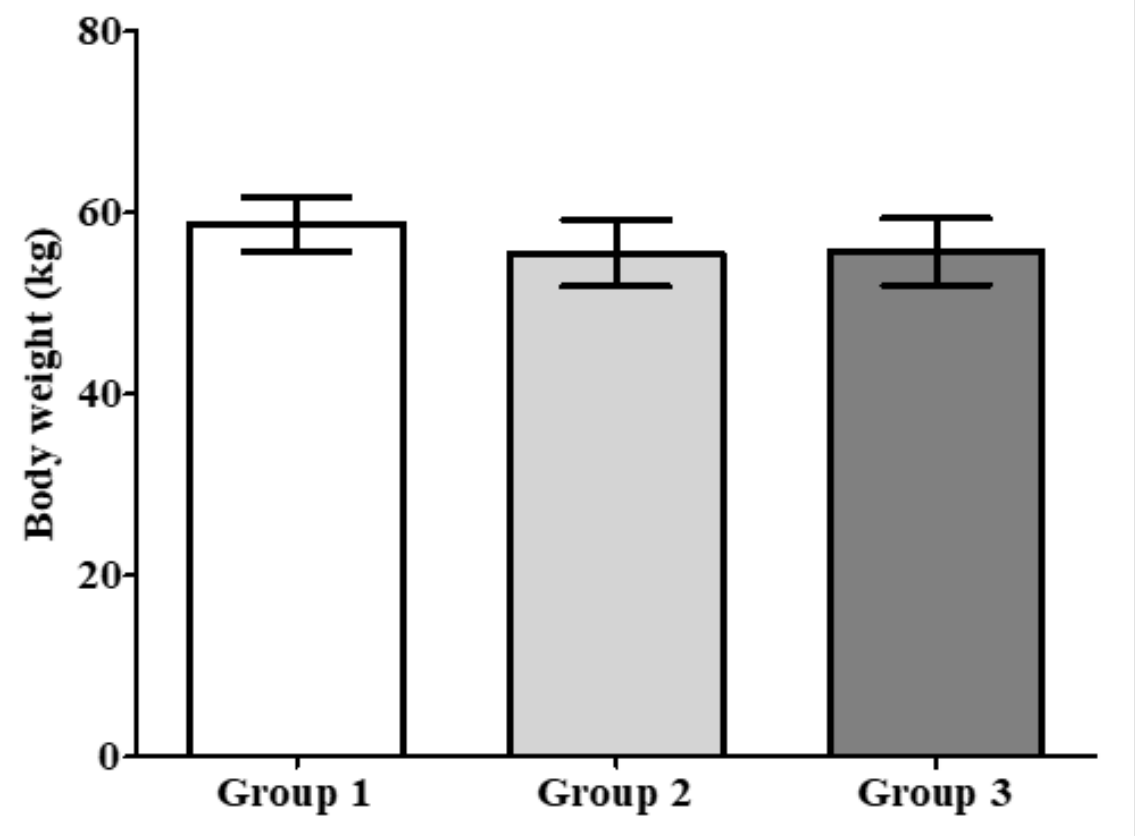

Figure 1: Body weight (Kg) in different studied groups.

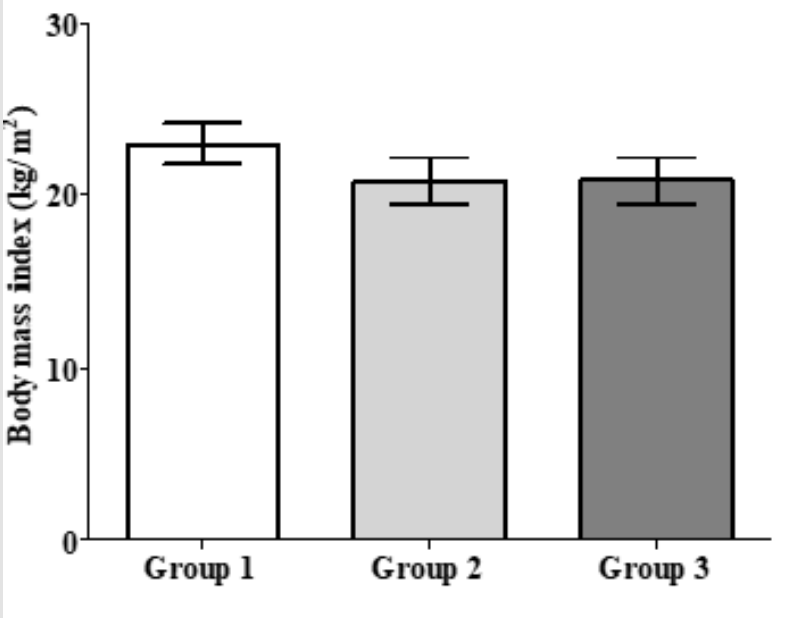

Figure 2: Body mass index (kg/m²) in different studied groups.

DOI: 10.26717/BJSTR.2022.47.007533

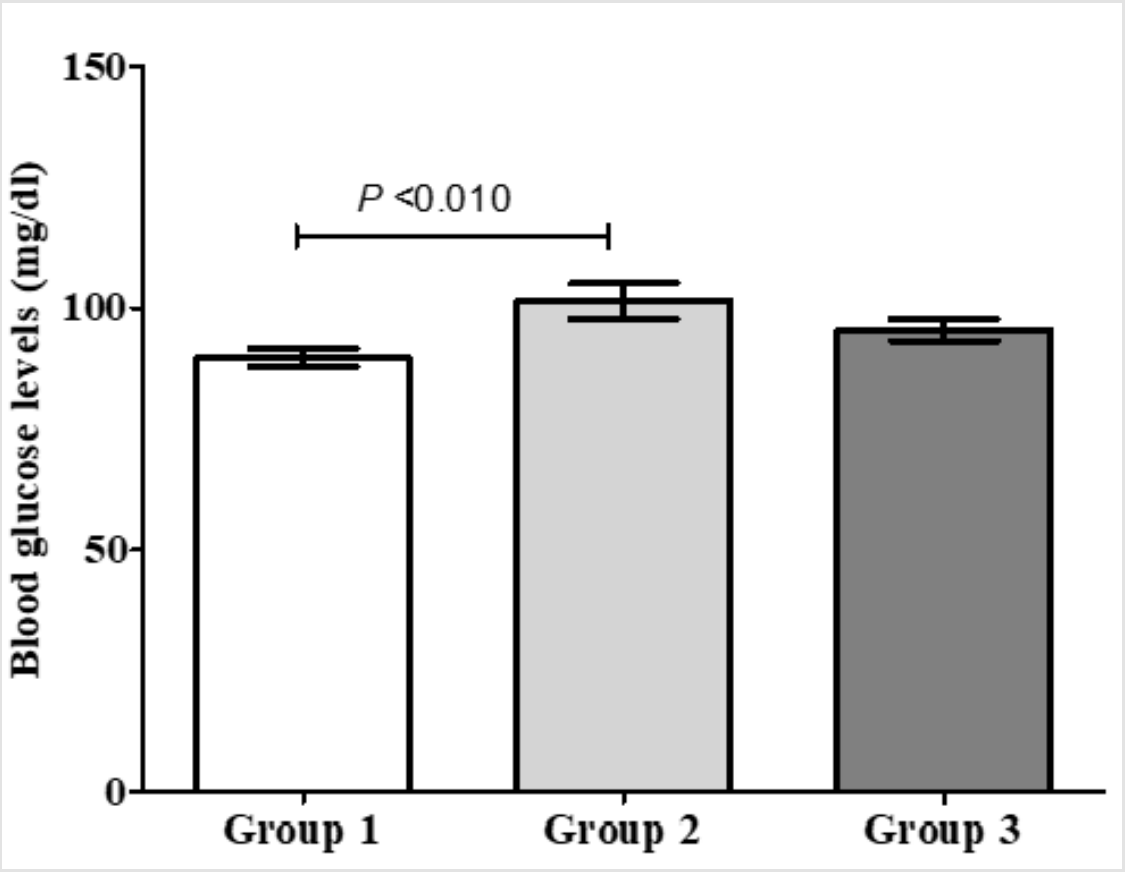

Figure 3: Blood glucose (mg/dl) in different studied groups.

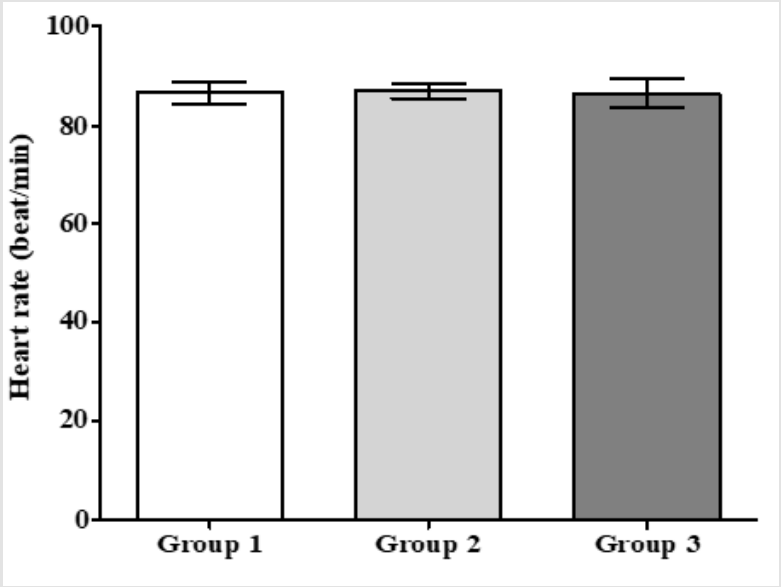

Figure 4: Heart rate (beats/min) in different studied groups.

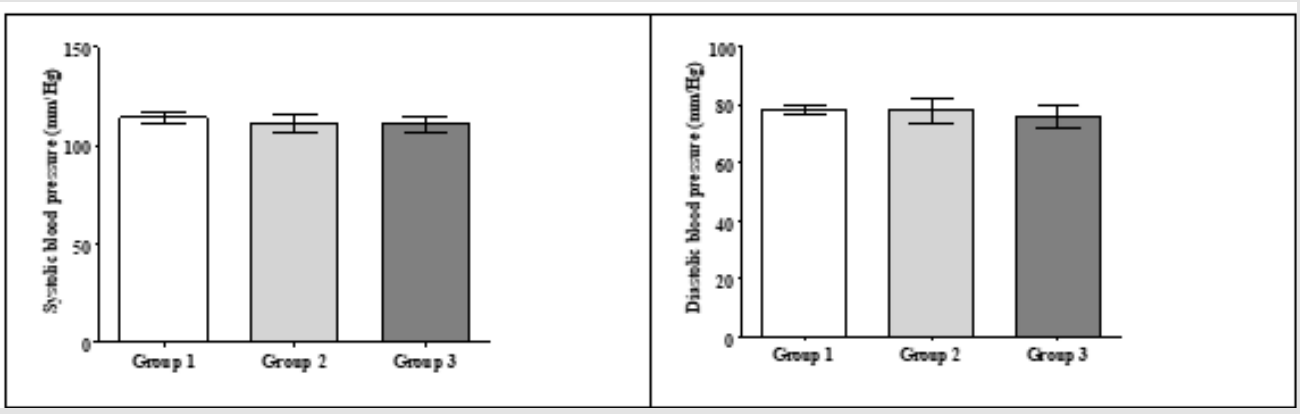

Figure 5: Blood pressure (mm/Hg) in different studied groups.

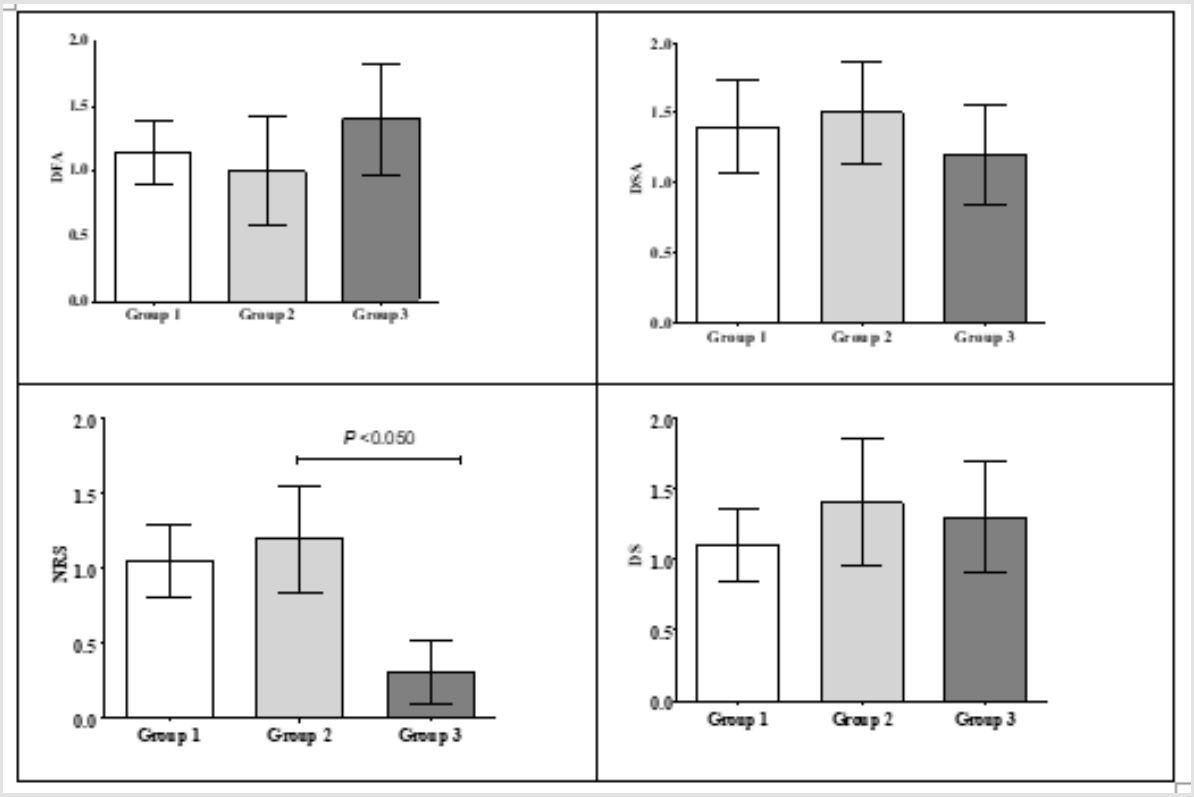

Figure 6.

Discussion

Millions of people drink coffee every day, making it one of the most popular drinks. The therapeutic effects of coffee have traditionally been attributed to the more interesting and researched component of caffeine, but it is now known that other substances also contribute to the drink's beneficial properties. Coffee's involvement in the prevention of some of the world's most dangerous and common diseases has ensured its classification as a functional beverage [2].

Weight, Body Mass and Blood Sugar

According to our findings, there were no significant variations in body weight, body weight, or blood glucose readings between volunteers who consumed large amounts of caffeinated and decaf-

feinated coffee (400 mg). When given the decaffeinated coffee dose, the participants in our study reported a lack of hunger, however when given the high-caffeine dose, the situation was normal. When examining the effects of decaffeinated coffee on body weight, caffeinated coffee was synergistic with a meal. Coffee (200 mg) (instant coffee) reduced CHO use faster than the no-meal study, while also increasing lipid oxidation. Finally, moderate caffeine (200 mg) or coffee consumption appears to provide additional benefits to weight-loss participants. However, extending our findings in the short term, caffeine causes weight loss in normal, slightly overweight people due to increased energy intake and changes in body composition, as well as reduced fat storage. Obese people, on the other hand, lose energy due to a higher metabolic rate, a lack of physical activity, and fat storage (Shirlow & Mathers+, 1385). Long-term caffeine and coffee use, according to this study, can aid weight loss. The results of trials are vague, and they provide little evidence. In a 24-week placebo-controlled human study, caffeine did not cause significant weight loss in obese patients.

Caffeine has been shown to increase thermogenesis, lipolysis, and fat oxidation, which can lead to significant weight loss in non-obese people. Coffee's non-caffeinated compounds may also aid weight loss, which could explain the epidemiological finding that increased decaffeinated coffee consumption is linked to weight loss (James A Greenberg [9]). The link between decaffeinated coffee and weight loss suggests that coffee's benefit is due to something other than caffeine. Chlorogenic acid in coffee, for example, may aid weight loss by reducing glucose absorption in the intestine. In a scientific investigation involving 12 healthy, normal-weight persons, adding 50 mg of caffeine to seven different brands of gum with varying amounts of caffeine increased the thermogenic impact. 100 mg of caffeine (less than a cup of coffee) increased diet-induced thermogenesis and resting metabolic rate by 3-4 percent in thin and obese subjects. Increased thermogenesis due to nutrition Even after accounting for baseline caffeine use, an increase in caffeine intake was connected to a reduction in weight gain. One limitation of our research was that weight data was self-reported. Finally, because this was an observational study, we cannot conclude that caffeine promotes weight gain or loss (Lopez-Garcia, et al. [10]). These previous investigations contradicted our findings.

Insomnia

In our study on insomnia and insomnia, there was no significant difference between high doses of coffee and high doses of decaffeinated coffee, demonstrating the association between insomnia and high doses of coffee, Among the symptoms observed in our study: In the decaffeinated coffee dose, the volunteers were able to obtain a comfortable and continuous sleep for a number of hours between 8-9 hours of continuous sleep and without sudden or frequent awakening, and they experienced persistent headache throughout the trial period from the first week They had a bad mood and suffered from lethargy and lethargy, but in the coffee dose, high caffeine sleep ranged between 5-7 hours with attention during sleep. Previous research contradicts our findings, and this studyAn increase in caffeine use has been associated to insufficient sleep length. Its use as a tonic during the day may cause sleep disruption at night, affecting waking up the next day. This vicious cycle may lead to increasing caffeine consumption in order to maintain alertness, particularly later in the day.

One aspect that makes this association worse is caffeine usage. Caffeine usage on the same or subsequent nights causes sleep disruption. Caffeine, on the other hand, may cause users to have fewer sleep problems over time. Caffeine use, particularly among the middle-aged, has been demonstrated to predispose users to a signal that promotes circadian alertness throughout the day while simultaneously disrupting sleep, as shown here and earlier (Chaudhary, et al. [5]). A previous study agrees with our results, The findings of this study back up the dose-response hypothesis between coffee and headache and insomnia frequency and prevalence. After adjusting for potential confounding factors such as age and body mass, these relationships remained substantial and are biocompatible for both sexes. There was no link discovered between the frequency of symptoms and the caffeine source. (Shirlow & Mathers+, 1385a).

Blood Pressure and Heart Rate

Our research looked at blood pressure and heart rate, and we found that there is no significant difference between taking two doses of coffee, one of them containing a high rate of caffeine and the other decaffeinated on blood pressure and heart rate. Among the symptoms that were observed in our study: In the dose of decaffeinated coffee there was a slight but noticeable drop in blood pressure, but the blood pressure in the high dose of caffeine was almost normal. And there was a previous study that did not agree with our study, and this study says that, There is clear evidence of the antihypertensive effect of caffeine According to experimental studies, after acute consumption in caffeine users who have fasted from caffeine for at least one week. After only 12-24 hours, caffeine use led in a significant increase in blood pressure and a decrease in heart rate. The effect of drinking eight regular cups of decaffeinated coffee on blood pressure was studied for four weeks. Previous studies may have been unable to identify a tiny, long-term benefit due to a lack of statistical power; another reason for the disagreement with the current study could be the duration; blood pressure can take up to 4 weeks to adjust to a different brand of coffee (van Dusseldorp, et al. [11]). Coffee drinking has been associated to higher systolic and diastolic blood pressure in previous studies, according to another study. A positive relationship between habitual coffee consumption and blood pressure has been established in various

cross-sectional studies. Over a six-year period of follow-up, coffee consumption was found to be directly associated to changes in blood pressure. According to this study, the presence of caffeine in coffee had a greater impact on blood pressure than the presence of another component. Long-term research, on the other hand, may have revealed a reduced effect due to continual adaptation to the stress consequences of coffee consumption. However, adaptation happens quickly, and our findings imply that there is a link between coffee use and hypertension (Ha Jee, et al. [12]).

There was a previous study in agreement with our study, in this report, the effect of ordinary coffee was not intended to be described except in comparison to decaffeinated coffee. In this study, neither decaffeinated nor ordinary coffee caused a significant difference in heart rate. After drinking coffee, there was no change in heart rate or blood pressure in cardiac patients. (Prakash, et al. [13,14]). Several trials of healthy participants and cardiac patients reported no significant variations in heart rate after consuming 70 to 150 mg of caffeine. Caffeine is thought to trigger arrhythmias, albeit there is little evidence to back up this theory, two 6-ounce cups of ordinary coffee (Yuban Instant) had roughly 175 mg of caffeine in them, while two 6-ounce cups of decaffeinated coffee (sanka) had about 6 mg (Patricia Esquivel [15]).

Conclusion

Through this conducted study, the effect of caffeinated coffee (Turkish coffee) and decaffeinated coffee (Arabic coffee) on weight, body mass, insomnia, blood pressure, heart rate and blood sugar was investigated. (K J Acheson [16]). The results of the study concluded that there were no statistically significant differences in the intake of the two doses. On all of our criteria in this study, there was a difference only in blood glucose and in one of the insomnia questions NRS. (M J Shirlow [17]).

Suggestions

It was suggested at the end of this study to use almost the same method, but with a difference in time, to have a longer time for the experiment to show better results, and to use the same high-caffeinated coffee.

References

1. M S Butt, M T Sultan (2011) Coffee and its Consumption: Benefits and Risks. Critical Reviews in Food Science and Nutrition 51(4): 363-373.
2. A Iriondo DeHond, M Iriondo DeHond, M D d Cas (2020) Applications of Compounds from Coffee Processing By-Products. Biomolecules 10(9): 1219.
3. M A Ninad S Chaudhary, M T N J Jackson, M A Subhajit Chakravorty (2016) Caffeine consumption, insomnia and sleep duration: Results from a nationally representative sample. Elsevier 32(11-12): 1193-1199.
4. A Gavrieli, E Karfopoulou, E Kardatou, E Spyreli, E Fragopoulou, et al. (2013) Effect of Different Amounts of Coffee on Dietary Intake and Appetite of Normal- Weight and Overweight/Obese Individuals. The Obesity Society 21(6): 1127-1132.
5. N S Chaudhary, M A Grandner, M J Jackson, M A Subhajit Chakravorty (2016) Caffeine consumption, insomnia, and sleep duration: Results from a nationally representative sample. Elsevier 32(11-12): 1193-1199.
6. BirsenYılmaz, NilüfercAcar-Tek, Saniye Sözlü (2017) Turkish cultural heritage: a cup of coffee. Journal of Ethnic Foods 4(4): 213-220.
7. T T V L P Smits (1985) The cardiovascular effects of regular and decaffeinated coffee. British Journal of Clinical Pharmacology 19(6): 852-854.
8. R S Afifi, W A Rahahleh, K A Hadidi (2008) Caffeine Content in Turkish Coffee: A Question of Concern in Sport Community. Educational Sciences 35: 730-738.
9. C N B A G James A Greenberg (2006) Coffee, diabetes, and weight control. The American Journal of Clinical Nutrition 84(4): 682-693.
10. F B H JoAnn E Manson, Esther Lopez-Garcia, Rob M van Dam, Swapnil Rajpathak, Walter C Willett, et al. (2006) Changes in caffeine intake and long-term weight change in men and women. The American Journal of Clinical Nutrition 83(3): 674-680.
11. M van Dusseldorp, P Smits, T Thien, M B Katan (1989) Effect of decaffeinated versus regular coffee on blood pressure. A 12-week, double-blind trial. Hypertension 14(5): 563-569.
12. S H Jee, J He, P K Whelton, I Suh, M J Klag (1999) The Effect of Chronic Coffee Drinking on Blood Pressure A Meta-Analysis of Controlled Clinical Trials. Hypertension 33(2): 647-652.
13. R. Prakash, V S Kaushik (1988) Acute Effect of Decaffeinated Coffee on Heart Rate, Blood Pressure, and Exercise Performance in Healthy Subjects. The National Center for Biotechnology Information 80(1): 71-74.
14. Emilia Papakonstantinou, Ioanna Kechribari, Kyriaki Sotirakoglou, Petros Tarantilis, Theodora Gourdomichali, et al. (2016) Acute effects of coffee consumption on self-reported gastrointestinal symptoms, blood pressure and stress indices in healthy individuals. Nutrition Journal 15: 26.
15. Patricia Esquivel, V M Jiménez (2012) Functional properties of coffee and coffee by-products. Elsevier 46(2): 488-495.
16. K J Acheson, B Zahorska-Markiewicz, P Pittet, K Anantharaman, E Jéquier (1980) Caffeine and coffee: their influence on metabolic rate and substrate utilization in normal weight and obese individuals. The American Journal of Clinical Nutrition 33(5): 989-997.
17. C D M M J SHIRLOW (1985) A Study of Caffeine Consumption and Symptoms: Indigestion, Palpitations, Tremor, Headache, and Insomnia. International Journal of Epidemiology 14(2): 239-248.

ISSN: 2574-1241

DOI: 10.26717/BJSTR.2022.47.007533

Noorah Saleh Al-Sowayan. Biomed J Sci & Tech Res