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Research Article

IMPACT OF CAFFEINE INTAKE ON DIET AND WEIGHT LOSS AMONG SAUDI POPULATION: A CROSS-SECTIONAL STUDY

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Abstract:

Objective: To investigate the impact of caffeine intake on diet and weight loss among the Saudi population.

Methods: This research will utilize a cross-sectional study design to examine the impact of caffeine intake on diet and weight loss among the Saudi population. Cross-sectional studies are well-suited for investigating associations and trends within a specific population at a single point in time, making them a suitable choice for this research question.

Results: The study included 610 participants. The most frequent age among them was 25-30 years (n= 164, 27%), followed by less than 25 years (n= 162, 26.6%). The most frequent gender among study participants was female (n= 416, 68%) followed by male (n= 194, 32%). The most frequent body mass index (BMI) value among study participants was normal 18.5-24.9 kg/m² (n= 226, 37%), followed by overweight 25-29.9 kg/m² (n= 192, 31%). The most frequent Nationality among them was Saudi (n= 559, 92%), other hands non-Saudi (n= 51, 8%). Source of caffeine among study participants, with most of them having drink coffee (n= 460, 75.4%) followed by tea (n= 93, 15.2%), and the least common is Macha (n= 7, 1.1%). The most frequent of how many kilos were lost among them it was didn't lose any weight (n= 507, 83.1%), followed by loss 1-2 kilos (n= 72, 11.8%). The most frequent of how many kilos were gained among them it was didn't gain any weight (n= 539, 88.4%), followed by gain 1-2 kilos (n= 45, 7.4%). The most frequent of kinds of coffee among them it was caffeine coffee (n= 535, 88%), other hand the decaf coffee (n= 75, 12%).

Conclusion: The study results showed that most participants were normal weight, followed by overweight, and most were Saudi and had a university education. Most of them take caffeine from drinking coffee with caffeine without any additives. The reason most participants drink coffee is to enjoy it.

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INTRODUCTION:

Longitudinal studies have connected increased coffee intake with a decreased chance of developing type 2 diabetes mellitus, despite short-term metabolic studies suggesting deleterious effects of caffeine on insulin sensitivity [1]. An advantageous impact of caffeine on weight, a significant predictor of diabetes, may contribute to the inverse connection between coffee and diabetes. Previous short-term studies demonstrating an enhanced metabolic rate and thermogenesis following caffeine administration [3] provide weight to this theory.

Many people who are trying to lose weight turn to supplements containing a mix of caffeine and ephedra alkaloids. Only this herbal formulation has shown any weight reduction benefit in randomized clinical studies [4]. However, these trials only lasted for around six months [5-9] and did not look at caffeine's effects over the long haul. Only one other research has looked at the link between caffeine use and weight change in the past [10], so far as we are aware.

The research problem at the core of this study stems from the pressing concern of obesity and its associated health consequences in Saudi Arabia. In recent years, the country has witnessed a dramatic increase in obesity rates, which has been linked to various chronic health conditions, including diabetes, cardiovascular diseases, and hypertension. Despite the significance of this issue, there is a notable lack of comprehensive research addressing the role of caffeine consumption in the Saudi population's dietary patterns and weight management efforts. This research problem seeks to investigate whether caffeine intake, particularly through traditional coffee consumption, plays a substantial role in affecting diet and weight loss within the Saudi context.

Another aspect of the research problem lies in the unique cultural and dietary habits in Saudi Arabia. The country has a rich tradition of coffee consumption, particularly Arabic coffee, which has become an integral part of social gatherings and hospitality.

Understanding the potential impact of caffeine from such sources on dietary choices and weight management is essential in tailoring effective health interventions. It is crucial to explore whether these cultural practices align with or diverge from global trends regarding caffeine and its influence on weight loss, which forms a significant knowledge gap this study aims to address.

Additionally, the research problem seeks to uncover whether caffeine can be leveraged as an affordable and accessible solution to address the obesity epidemic in Saudi Arabia. With limited access to certain weight management resources, caffeine, if found to be effective, could offer a cost-effective and culturally relevant approach to promoting healthier dietary choices and aiding weight loss efforts. This aspect of the problem carries implications for public health policy and interventions, both within Saudi Arabia and in other regions with similar cultural and dietary practices.

METHODS:**Study design**

This research will utilize a cross-sectional study design to examine the impact of caffeine intake on diet and weight loss among the Saudi population. Cross-sectional studies are well-suited for investigating associations and trends within a specific population at a single point in time, making them a suitable choice for this research question.

Study approach

The study will be conducted in various regions across Saudi Arabia, encompassing both urban and rural areas to ensure a representative sample of the population's diversity in terms of lifestyle, dietary habits, and access to healthcare services.

Study population

The target population for this study comprises adult residents of Saudi Arabia, aged 18 years and above. This diverse population will represent various ethnic, socio-economic, and cultural backgrounds.

Study sample

A representative sample will be selected through stratified random sampling to ensure the inclusion of individuals from different age groups, genders, and geographic locations. The sample size will be calculated to achieve adequate statistical power and precision. The sampling process will involve identifying strata based on demographic factors and selecting random samples from each stratum.

Study tool

For the current study, the questionnaire was adopted for data collection, which was also categorized as a study tool.

Data collection

Data will be collected through an online questionnaire in Google Forms.

Data analysis

The collected data will be analyzed using statistical software. Descriptive statistics will be used to present the characteristics of the study population, while inferential statistics like regression analysis, chi-squared tests, and correlation analysis will be employed to examine relationships between caffeine intake, dietary patterns, and weight loss efforts. Results will be reported as odds ratios, mean differences, and p-values as appropriate using SPSS software.

Ethical considerations

Ethical considerations will be strictly adhered to throughout the study. The research will obtain informed consent from all participants, ensuring their rights, privacy, and confidentiality are protected. Ethical approval will be sought from the relevant institutional review board or ethics committee, and the study will comply with the principles of the Declaration of Helsinki and other relevant ethical guidelines. Participants' data will be anonymized and stored securely to protect their privacy and confidentiality.

RESULTS:

The study included 610 participants. The most frequent age among them was 25-30 years ($n=164$, 27%), followed by less than 25 years ($n=162$, 26.6%). Figure 1 shows the age distribution among study participants. The most frequent gender among study participants was female ($n=416$, 68%) followed by male ($n=194$, 32%). Figure 2 shows the gender distribution among study participants. The most frequent body mass index (BMI) value among study participants was normal $18.5-24.9 \text{ kg/m}^2$ ($n=226$, 37%), followed by overweight $25-29.9 \text{ kg/m}^2$ ($n=192$, 31%). Figure 3 shows the distribution of BMI among study participants.

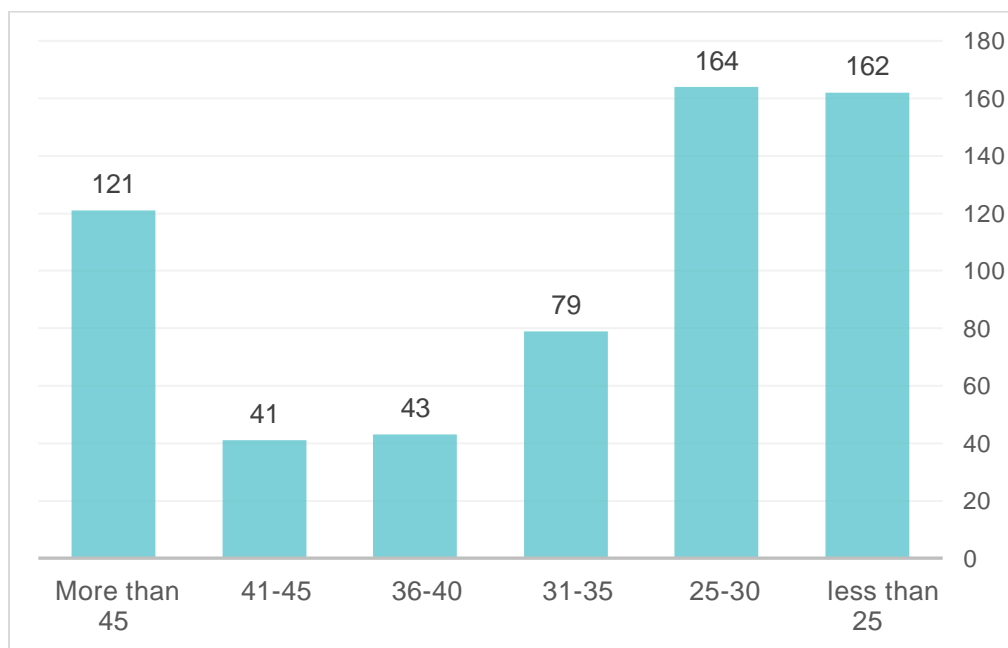


Figure 1: Age distribution among study participants

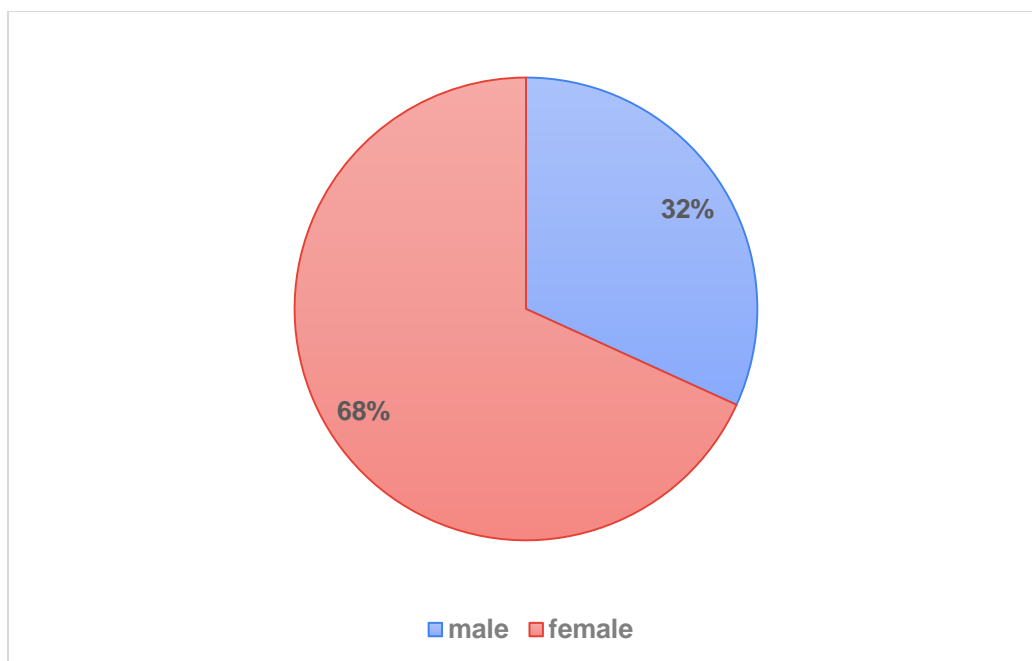


Figure 2: Gender distribution among study participants

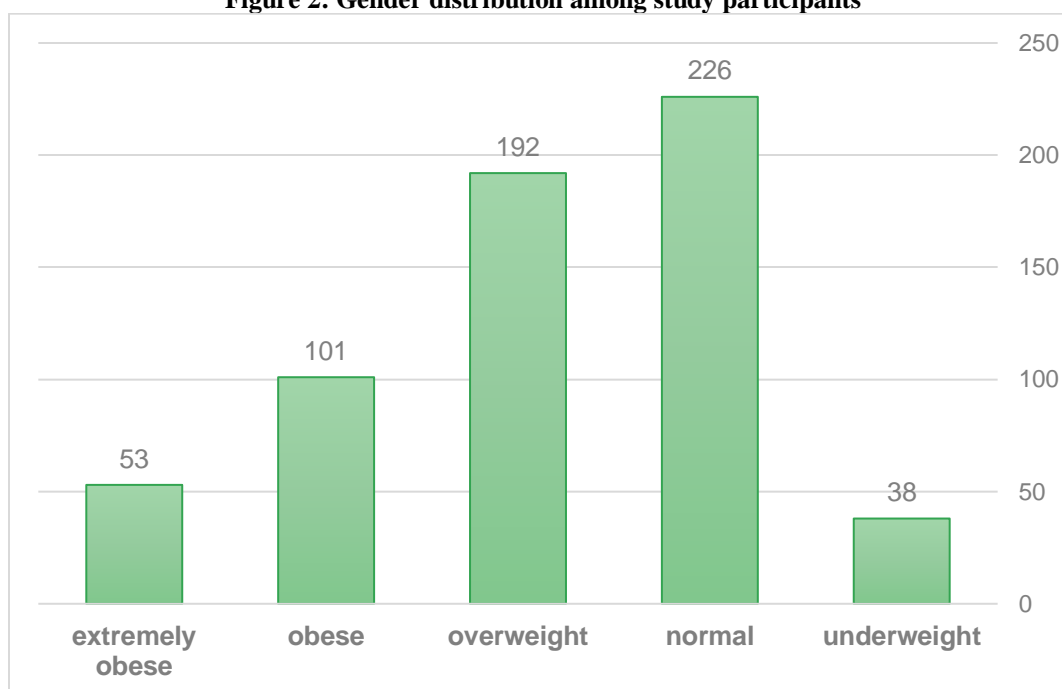


Figure 3: BMI distribution among study participants

The most frequent of Nationality among them was Saudi (n= 559, 92%), other hands non Saudi (n= 51, 8%). Figure 4 shows the percent of nationality distribution among the study.

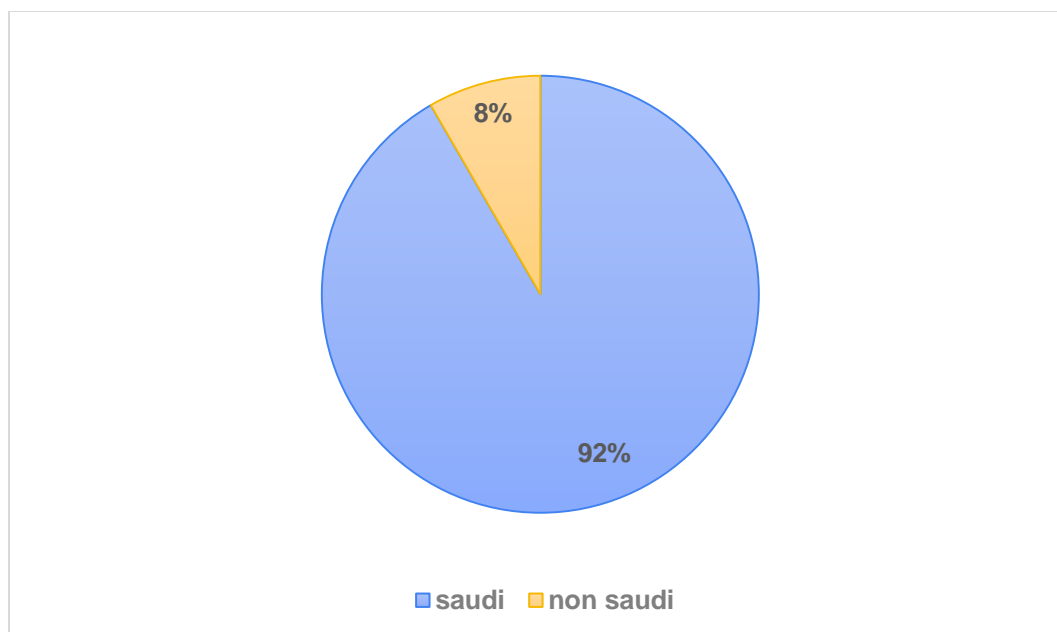


Figure 4: Nationality distribution among study participants

Source of caffeine among study participants, with most of them having drink coffee (n= 460, 75.4%) followed by tea (n= 93, 15.2%), and the least common is Macha (n= 7, 1.1%). The perceived source of caffeine intake is presented in Figure 5.

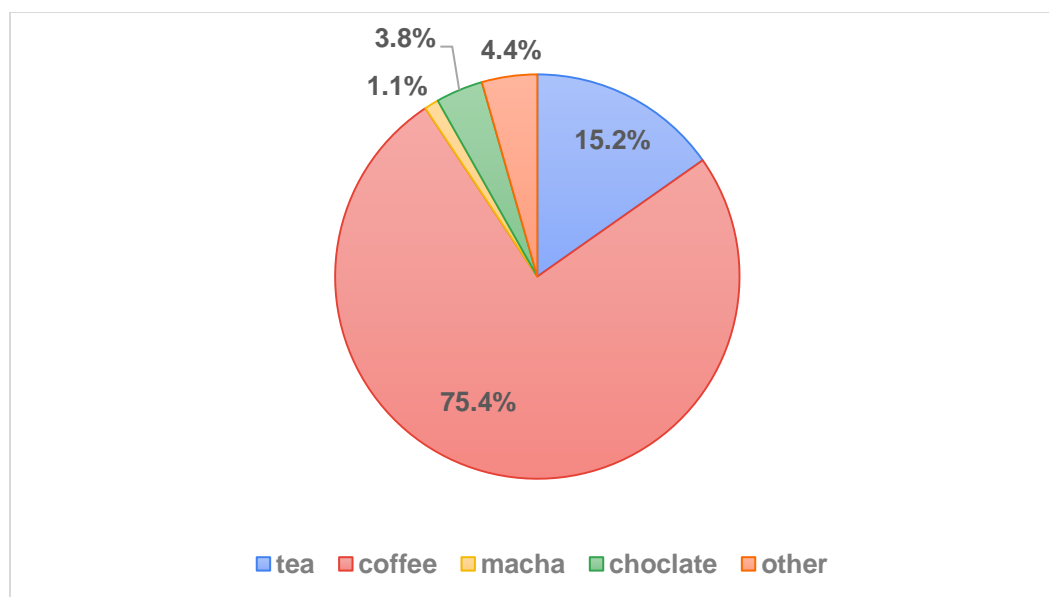


Figure 5: Source of caffeine distribution among study participants

The most frequent of how many kilos were lost among them it was didn't lose any weight (n= 507, 83.1%), followed by loss 1-2 kilos (n= 72, 11.8%). The most frequent of how many kilos were gained among them it was didn't gain any weight (n= 539, 88.4%), followed by gain 1-2 kilos (n= 45, 7.4%).

The most frequent of type of coffee among them it was caffeine coffee (n= 535, 88%), other hand the decaf coffee (n= 75, 12%).

Participants were asked to rate their beliefs about coffee and caffeine. Their responses and results are shown in Table 1.

Table 1: Participants responses' to survey scale items			
scale item	Yes	No	don't know
Do you think coffee makes you gain weight?	57	435	118
	9%	71%	19%
Do you think that coffee reduces your weight?	121	323	166
	20%	53%	27%
Do you think that caffeine reduces the risk of diabetes?	63	243	304
	10%	40%	50%
Do you think that caffeine reduces the risk of heart disease?	120	267	223
	20%	44%	37%
Do you think that genetic differences between individuals can affect our bodies' responses to the effect of coffee on weight?	323	87	200
	53%	14%	33%
Do you think that the caffeine in coffee helps metabolism?	172	168	270
	28%	28%	44%

Participants were asked about the time of drink there cup of coffee, the most of them answered there is no specific time (n=313, 51.3%), followed early in the morning (n=206, 33.8%). Figure 6 shows the distribution of the time of drink coffee among study participants.

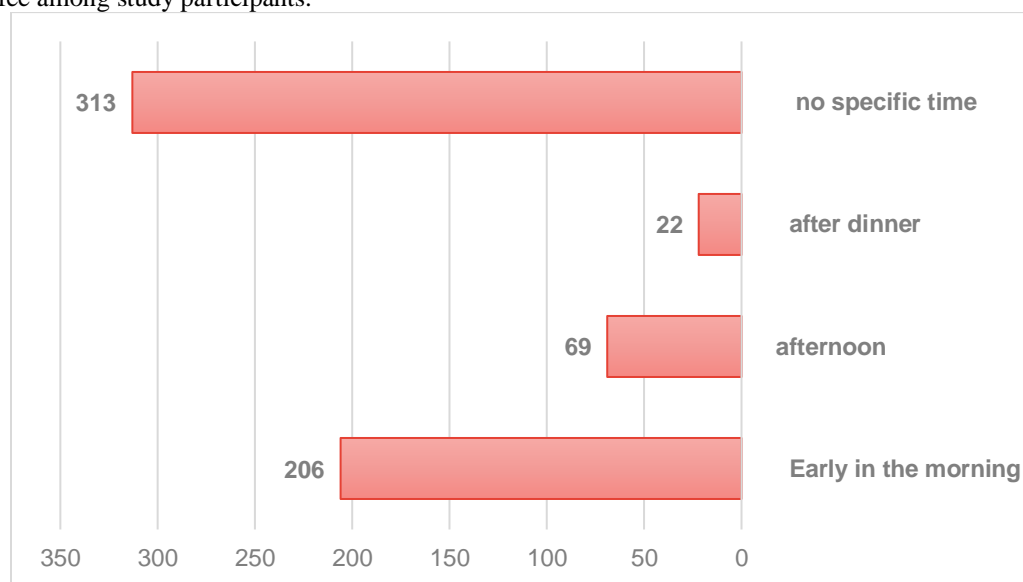


Figure 6: Time of drink coffee distribution among study participants

DISCUSSION:

Caffeine, a naturally occurring central nervous system stimulant found in coffee, tea, soft drinks, and various dietary supplements, has been a subject of substantial interest and research in the context of its impact on dietary patterns and weight management [11-14].

One of the central themes in caffeine research pertains to its influence on metabolism. Caffeine is well-documented to increase resting metabolic rate (RMR) and thermogenesis, thus potentially enhancing energy expenditure. The mechanism behind this metabolic boost involves the release of catecholamines, which promote lipolysis and stimulate the breakdown of stored fat. This thermogenic effect has led to caffeine being explored as a potential aid in weight management. However, the impact of caffeine can vary depending on factors such as individual tolerance and dosage [15-17].

CONCLUSION:

The study results showed that most participants were normal weight, followed by overweight, and most were Saudi and had a university education. Most of them take caffeine from drinking coffee with caffeine without any additives. The reason most participants drink coffee is to enjoy it.

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ANNEX 1: DATA COLLECTION TOOL

1. How old are you?
 - less than 25
 - 25-30
 - 31-35
 - 36-40
 - 41-45
 - More than 45
2. What is your gender?
 - Male
 - Female
3. What is your Nationality?
 - Saudi
 - Not Saudi
4. What is your educational level?
 - uneducated
 - the school
 - the university
5. What is your marital status?
 - Single
 - Married
 - divorced
 - widow
6. What is your height?
 - <150 cm
 - 151-160 cm
 - 161-170 cm
 - 171-180 cm
 - >181 cm
7. What is your weight?
 - <50 Kg
 - 51-65 Kg
 - 66-75 Kg
 - 76-85 Kg
 - 86-95 Kg
 - >96 Kg
8. What is your BMI value?
 - <18.5
 - 18.5-24.9
 - 25-29.9
 - 30-34.9
 - >35

9. What is the source of your daily caffeine?
 - Tea
 - Coffee
 - Macha
 - Chocolate
 - others
10. What time of day do you drink a cup of coffee?
 - Early in the morning
 - afternoon
 - after dinner
 - no specific time
11. Do you think coffee makes you gain weight?
 - Yes
 - No
 - don't know
12. Do you think that coffee reduces your weight?
 - Yes
 - No
 - don't know
13. Do you think that caffeine reduces the risk of diabetes?
 - Yes
 - No
 - don't know
14. Do you think that caffeine reduces the risk of heart disease?
 - Yes
 - No
 - don't know
15. How many cups of coffee do you drink during the day?
 - One cup
 - 2-3 cups
 - 4-5 cups
 - More the 5 cups
16. Do you think that genetic differences between individuals can affect our bodies' responses to the effect of coffee on weight?
 - Yes
 - No
 - Don't know
17. Do you drink black coffee with additions?
 - Without additions
 - milk
 - sugar
 - artificial flavor
 - Chocolate
 - Other additions
 - Protein meals

18. What type of coffee do you drink??

- Decaf coffee
- Caffeine coffee

19. How many kilograms did you lose because of drinking caffeine drinks during the month?

- Didn't lose any weight
- 1-2 kilogram
- 3-5 kilogram
- More than 5 kilograms.

20. How many kilograms did you gain from drinking caffeine during the month?

- Didn't gain any weight
- 1-2 kilogram
- 3-5 kilogram
- More than 5 kilograms

21. Do you crave any sweets with a cup of coffee?

- Yes
- No

22. Do you think that the caffeine in coffee helps metabolism?

- Yes
- No
- Don't know

23. What kind of coffee do you drink?

- Instant coffee
- Brewed coffee
- Freshly ground coffee beans

24. What is the reason for drinking coffee?

- Weight loss
- Gain weight
- Maintain weight
- Enjoy it

APPENDIX 2: Participants responses to scale items

Participants responses to survey scale items			
scale item	Yes	No	don't know
Do you think coffee makes you gain weight?	57	435	118
	9%	71%	19%
Do you think that coffee reduces your weight?	121	323	166
	20%	53%	27%
Do you think that caffeine reduces the risk of diabetes?	63	243	304
	10%	40%	50%
Do you think that caffeine reduces the risk of heart disease?	120	267	223
	20%	44%	37%
Do you think genetic differences between individuals can affect our bodies' responses to the effect of coffee on weight?	323	87	200
	53%	14%	33%
Do you think that the caffeine in coffee helps metabolism?	172	168	270
	28%	28%	44%

SPSS:

age		
	Frequency	Percent
less than 25	162	26.6%
25-30	164	26.9%
31-35	79	13%
36-40	43	7%
41-45	41	6.7%
More than 45	121	19.8%
Total	610	100%

gender		
	Frequency	Percent
male	194	32%
female	416	68%
Total	610	100%

Nationality		
	Frequency	Percent
Saudi	559	92%
non Saudi	51	8%
Total	610	100%

educational level		
	Frequency	Percent
uneducated	20	3%
the school	94	15%
the university	496	81%
Total	610	100%

marital status		
	Frequency	Percent
Single	283	46%
Married	287	47%
divorced	28	5%
widow	12	2%
Total	610	100%

BMI		
	Frequency	Percent
underweight	38	6%
normal	226	37%
overweight	192	31%
obese	101	17%
extremely obese	53	9%
Total	610	100%

source of caffeine

	Frequency	Percent
Tea	93	15.2%
Coffee	460	75.4%
Macha	7	1.1%
chocolate	23	3.8%
other	27	4.4%
Total	610	100%

coffee time

	Frequency	Percent
Early in the morning	206	33.8%
afternoon	69	11.3%
after dinner	22	3.6%
no specific time	313	51.3%
Total	610	100.0%

cups of coffee

	Frequency	Percent
One cup	286	46.9%
2-3 cups	225	36.9%
4-5 cups	64	10.5%
More the 5 cups	35	5.7%
Total	610	100%

Addition with coffee

	Frequency	Percent
Without additions	323	53.0%
milk	186	30.5%
sugar	41	6.7%
artificial flavor	6	1.0%
Chocolate	16	2.6%
Other additions	32	5.2%
Protein meals	6	1.0%
Total	610	100%

kind of coffee

	Frequency	Percent
Decaf coffee	75	12%
Caffeine coffee	535	88%
Total	610	100%

many kilo lost

	Frequency	Percent
Didn't lose any weight	507	83.1%
1-2 kilogram	72	11.8%
3-5 kilogram	22	3.6%
More than 5 kilograms.	9	1.5%
Total	610	100.0%

many kilo gain

	Frequency	Percent
Didn't gain any weight	539	88.4%
1-2 kilogram	45	7.4%
3-5 kilogram	16	2.6%
More than 5 kilograms	10	1.6%
Total	610	100%

reason for drink coffee

	Frequency	Percent
Weight loss	27	5%
Gain weight	10	2%
Maintain weight	4	1%
Enjoy it	569	93%
Total	610	100%

type of coffee

	Frequency	Percent
Instant coffee	55	9%
Brewed coffee	185	30%
Freshly ground coffee beans	370	61%
Total	610	100%

Chi-Square Test**Test Statistics**

	Source of caffeine	Coffee time	gain weight	lose weight	diabetes	heart disease	Cups coffee
Chi-Square	1206.033 ^a	345.082 ^b	405.072 ^c	110.620 ^c	154.430 ^c	55.990 ^c	293.226 ^b
df	4	3	2	2	2	2	3
Asymp. Sig.	.000	.000	.000	.000	.000	.000	.000

Test Statistics

	Genetic difference	Addition with coffee	Type coffee	Many kilo lost	Many kilo gain	Any sweet with coffee	metabolism
Chi-Square	137.039 ^a	1019.026 ^b	346.885 ^c	1113.266 ^d	1310.669 ^d	126.695 ^c	32.826 ^a
df	2	6	1	3	3	1	2
Asymp. Sig.	.000	.000	.000	.000	.000	.000	.000

Test Statistics

	Kind coffe	Reason for drink coffee	BMI
Chi-Square	246.475 ^a	1518.564 ^b	229.295 ^c
df	2	3	4
Asymp. Sig.	.000	.000	.000

all P-value = 0 < 0.05

To test the independence between variable using chi-square test and prove it all independent

Regression

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Source of caffeine	Between Groups	7.369	4	1.842	2.623	.034
	Within Groups	424.875	605	.702		
	Total	432.244	609			
Coffee time	Between Groups	16.946	4	4.237	2.243	.063
	Within Groups	1142.785	605	1.889		
	Total	1159.731	609			
Cups coffee	Between Groups	2.911	4	.728	.980	.418
	Within Groups	449.214	605	.743		
	Total	452.125	609			
Addition with coffee	Between Groups	10.138	4	2.535	1.303	.268
	Within Groups	1177.147	605	1.946		
	Total	1187.285	609			
Type Coffee	Between Groups	1.741	4	.435	4.111	.003
	Within Groups	64.038	605	.106		
	Total	65.779	609			
Kind of coffee	Between Groups	9.086	4	2.271	2.923	.021
	Within Groups	470.095	605	.777		
	Total	479.180	609			

There is a significance different between BMI and (source of caffeine, Type of coffee and Kind of coffee).