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COFFEE CONSUMPTION ASSISTANT IN THE CHANGES OF BODY WEIGHT AND HEIGHT BUT NOT IN THE BODY MASS INDEX

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Abstract:

Backgrounds: Coffee consumption has recently received special attention, as many health benefits have been found to be associated with its drinking. A lot of challenges have received on the coffee consumption and body weight status. The aim of the present work was to find out the relationship between coffee consumption and body weight, height and BMI.

Methods: A total of 310 subjects with 144 male and 166 female included in the study and body weight was undertaken before (usual weight) after using dietary program (current weight) and BMI was calculated. The subject filling out the self-constructed questionnaire. All data analyzed by using SPSS T test and Chi-square test was performed.

Result and discussions: The effect of coffee on body weight were investigated by numbers of questions. Coffee consumption did not have effect on the appetite rather assistant in body weight reduction in man ($P< 0.05$) and reduced body height in both man and women but have no effect on BMI. Furthermore, coffee shown decelerating or slowest weight loss in women. Women were more found significantly consumed coffee/ day than man by which 2-3 cups/day. The age groups were most common affected by reducing body weight through consumption of coffee was those between 20-30 years old.

Conclusion: Coffee consumption was assistant in body weight loss in man, but not in women, decelerated height growth and have no effect on the BMI and appetite. Furthermore women shown more coffee consumed than man and such work need to be more investigated beyond the mechanism in larger sample sizes.

Key words: coffee consumption, BMI, weight, Height, WC.

Introduction

Coffee consumption has paid special attention in the last decade, due to their health benefits (1).

Having gained substantial acceptance worldwide in the last few decades, coffee has been a preferred source of caffeine for many people. Coffee contain high caffeine content and also other bioactive compounds, such as polyphenol and chlorogenic acid which suggested to confer diverse health benefits (2). Recent works concluded that higher coffee intake may linked to lowering risk of type 2 diabetes, cardiovascular disease, certain cancers (e.g., breast, colorectal, endometrial, and prostate cancers), Parkinson's disease, and mortality (2, 3).

Obesity has been found as a major underlying cause for the aforementioned health risks, it is plausible that coffee intake may be accompany with reduced risk of obesity. Several researches have investigate the effect of coffee intake on adiposity, as assessed by diverse anthropometric measures including body mass index (BMI) or waist circumference (WC) (4-7). Nevertheless, the findings are largely inconsistent in the results ranging from suggesting anti-obesity benefit (1,7,8) to reporting no effect (9-11) and even indicating increased obesity associated with coffee consumption (12-14). Obesity has been reached global epidemic proportions (15), it is critical to evaluate the current evidence on the effect of coffee intake on body weight status. Effect of the coffee consumption on the body height has not received further attentions.

Due to rapid rise of obesity over the last decades has been primarily attributed to the dramatic changes in diet and lifestyle (16).

Due to the association between coffee consumption and obesity are not entirely consistent. Therefore, coffee is considering as the one of the most popular beverages in the world (17). Furthermore, as eating habits have become westernized and lifestyles have changed, the culture of drinking coffee has become common in Libya, therefore a limited or no study has been conducted in such

field so that our study could highlighted new conclusion. The aim of the present study was to determine the relationship between body weight status, height and BMI to the coffee consumption.

Materials and methods

Study population

A cross section study carried out from end of September 2019 to end of March 2020 on a café of polyclinics and Benghazi medical center (BMC) and on different local café in Benghazi.

Approached of our study is aged groups attending the polyclinics and BMC. The samples 310 subjects (144 male and 166 female) and the age of patients ranging between 18-45 years were involved in the study. After obtaining written consent, the subjects were requested to fill out a questionnaire. Although we approached different number of subjects and the final completed questionnaires in hand were 310. Hence, our overall response rate was 99%.

Questionnaire.

The questionnaire for this study based on 36 items divided into four sections. It contained questions about personal information, demographic and socioeconomic characteristics, coffee consumption, coffee habits, frequencies of coffee consumption.

Study design and anthropometric measurements.

The study involve those obese and or overweight on weight management program:

The study consist two groups of subjects, one is obese or overweight consumed coffee and the another group is obese or overweight non coffee consumers.

Usual body weight is the weight before starting dietary management program.

Current weight is the weight after or during using weight management program.

Body weight was measured by using weight scaling (Seca) to nearest 0.1 kg with minimal cloths and height was measured by meter tape to the nearest 0.1 cm. BMI was calculated by weight divided height square in meter and categorized as described by WHO (18) . WC and WHR also measured as described in (19).

Ethical statement

This study was granted approval by the local Ethics Committee of the Benghazi province. Informed written consent was obtained through a consent form that was given to the participants along with the questionnaire.

Statistical analysis

The data from the questionnaires was entered using Excel. Data set was exported to SPSS v.22 and Epi-info for complete analysis. The frequencies and percentages were presented that data, Chi-square test was performed. $p \leq 0.05$ was considered to be statistically significant. For quantitative data was presented as mean ± SD and student T test was performed for statistical significant in quantitative data.

Results

The data collected on 310 subjects shown that 144 (46.5%) male and 166 (53.5%) female (Figure 1). The age distribution of subjects were ranging between 18-45 years old by which about 40% (123) of subjects significantly have age groups between 20-30 years old (P=0.000) followed by age groups between 31-40 years old 29% (90) and being least those age groups 18-20 years old 10% (Table 1).

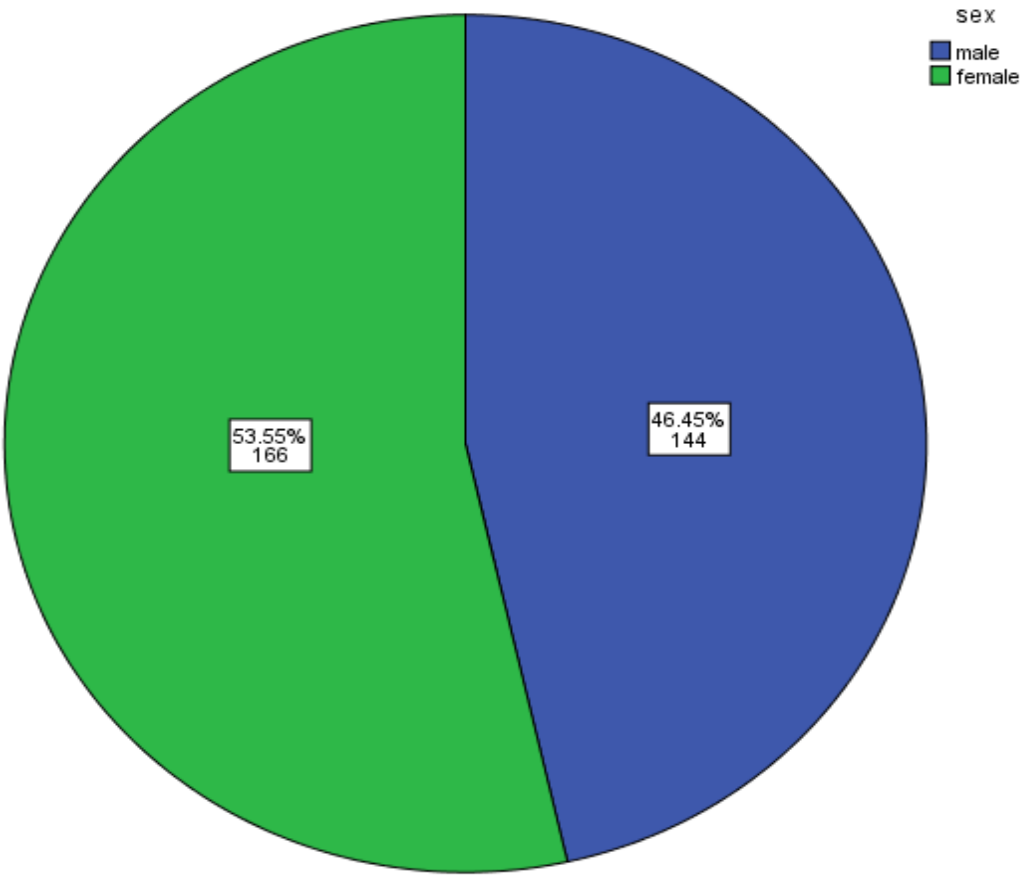

Figure 1: Gender distribution:

Table 1: Ages distributions of the subjects:

Age categories		N	N %	P values
age	18-20	32	10.3%	
	20-30	123	39.7%	0.000
	30-40	90	29.0%	
	>40	65	21.0%	
	Total	310	100.0%	

Chi-square test was performed and considered significant at $\alpha < 0.05$.

In the table (2), 94.5% 0f the subjects significantly consumed coffee (*P*=0.000), and the daily coffee consumed reported with highest percentages 1 cup a day which presented about 36 % followed by those consumed 2 cups/ day (35%). Arabic coffee was the predominate consumed among all types of coffee drinks (72.5%) with (*P*=0.000) (Table 2).

Table 2: Pattern of coffee consumption:

		N	N %	P values
consumption coffee every day	yes	293	94.5%	0.000
	no	17	5.5%	
	Total	310	100.0%	
Cups per day	1cup	111	35.8%	
	2cup	108	34.8%	
	3cup	59	19.0%	
	more than 3cup	32	10.3%	
	Total	310	100.0%	
Type of coffee consumed	Arabic	212	68.4%	0.000
	macchiato	33	10.6%	
	capitchino	8	2.6%	
	espresso	1	0.3%	
	Nescafe	36	11.6%	
	arabic-nesscofe	16	5.2%	
	arabic-capichino	3	1.0%	
	capitchino-nesscofe	0	0.0%	
	all	1	0.3%	
	Total	310	100.0%	

Chi-square test was performed and considered significant at $\alpha < 0.05$.

In regard the questions about effect of coffee consumed on appetite, found that , 52.9% of respondents their answers were coffee have no effect on appetite. However, about 43.2% of the participants have answered coffee consumed do have decreased the appetite. The most common of subjects preferred to drink coffee in the morning (47.1%) (P=0.00) and about 58% preferred to drink coffee with sugar (P=0.03). Furthermore, more of the respondents have had eaten main daily meals (58%) (P=0.03) (Table 3).

Table 3: coffee habits and behaviors:

		N	N %	P values
Added sugar to the coffee	yes	179	57.7%	0.03
	no	131	42.3%	
	Total	310	100.0%	
Time prefer to drink coffee	morning	106	34.2%	0.00
	afternoon	55	17.7%	
	night	15	4.8%	
	any time	78	25.2%	
	morning-afternoon	56	18.1%	
	Total	310	100.0%	
is there any effect of the coffee on the appetite	reduce the appetite	134	43.2%	
	increase the appetite	12	3.9%	
	no effect	164	52.9%	
	Total	310	100.0%	
Eaten 3 main meals /day	yes	179	57.7%	0.03
	no	131	42.3%	
	Total	310	100.0%	

Chi-square test was performed and considered significant at $\alpha < 0.05$.

Table 4 shown that, about 78% of the subjects follow dietary management program (*P*=0.000) while approximately 17.5% found that dietary program have had no effect on the body weight reduction. In addition, exercise program have had reported significantly practicing among the subjects (78.7% *P*= 0.000) (Table 4).

Table 4: Dieting and exercise program:

		N	N %	P values
change in the weight after follow dieting	loss	242	78.1%	0.000
	increase	14	4.5%	
	no effect	54	17.4%	
	Total	310	100.0%	
Doing exercise	yes	244	78.7%	0.000
	no	66	21.3%	
	Total	310	100.0%	

Chi-square test was performed and considered significant at $\alpha < 0.05$.

There was more than 87% of the subjects answered not taken medication for weight loss. However, more than 50% reported that taken caffeine containing medication (Panadol) (*P*=0.00) (Table 5).

Table 5: Using Medication for assessing body weight loss:

		N	N %	P values
did you take any drugs to lose weight	yes	38	12.3%	
	no	272	87.7%	
	Total	310	100.0%	
did you consume the following drug	Panadol	143	58.4%	0.00
	Aspirin	32	13.1%	
	anaphylactic drugs	9	3.7%	
	None	61	24.9%	
	Not know	65	21%	
	Total	245	100.0%	

Chi-square test was performed and considered significant at $\alpha < 0.05$.

The body weight status of the subjects were investigated and shown, Mean± SD of usual weight was 92.5 ± 18 kg and current weight was 82.8 ± 16 kg. Furthermore, the mean usual body mass index found 33 ± 8 and current body mass index 29.7± 6 kg (Table 6).

Table 6: Body weight status:

	Mean± SD
Usual weight	92.54± 18
Current weight	82.82± 16
Usual body mass index	33.33±8
Current body mass index	29.73±6

The result in the table 7, revealed that, coffee consumption had no effect on the body weight reduction and decelerating weight loss has been found through BMI (Table 7).

Table 7: Relationship between coffee consumption and body weight changes:

	Coffee consumption	
	yes	no
	Mean ± SD	Mean ± SD
Usual weight	92.10± 18	100.24±20
Current weight	82.82±17	82.88±12
Usual body mass index	33.24±18	34.90±7
Current body mass index	29.83±5	28.04±3

In the next, coffee consumptions was investigated in male and female. Coffee consumption was decelerating or slowest weight loss in female and assistant in weight loss in male (Table 8).

Table 8:Relationship between coffee consumption among male and female to body weight status:

	sex				
	male			female	
	do you consumption coffee every day			do you consumption coffee every day	
	yes	no		yes	no
	Mean	Mean	P values	Mean	Mean
Usual weight	94.37	102.62		90.26	92.50
Current weight	83.28	85.85	0.047	82.45	73.25
Usual body mass index	31.32	34.89		34.79	34.94
Current body mass index	28.12	28.14		31.21	27.71

T- test has been done for statistical significant at $\alpha < 0.05$.

Coffee consumption among male and female shown that female more consumed coffee than male but not significant (P=0.07) (Table 9 A) However, female particular consumed 2 cups / day shown significant higher than male ($P < 0.05$) (Table 9 B).

Table 9 A: consumption of coffee among male and female:

		sex				P values
		male		female		
		N	N %	N	N %	
Consumption of coffee	yes	131	91.0%	162	97.6%	0.07
	no	13	9.0%	4	2.4%	
	Total	144	100.0%	166	100.0%	

Table 9 B: coffee consumption among male and female:

	sex				P values
	male		female		
Coffee consumption/ day	N	N %	N	N %	
1cup	56	38.9%	55	33.1%	
2cup	37	25.7%	71	42.8%	0.000
3cup	34	23.6%	25	15.1%	
more than 3cup	17	11.8%	15	9.0%	
Total	144	100.0%	166	100.0%	

Chi-square- test has been done for statistical significant at $\alpha < 0.05$.

Furthermore, to exclude the cofound factors could affect body weight reduction rather than coffee. Physical exercise has been investigated and found that coffee consumption assistant in weight loss (P=0.03).

Table 9: Relationship between coffee consumption exercise and body weight status:

	do you consumption coffee every day				P values
	yes		no		
	do you doing any exercise		do you doing any exercise		
	yes	no	yes	no	
	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	
Current weight	82.19±6	85.09±5	82.20±15	88±20	0.03
Current body mass index	29.56±6	30.80±5	27.80±5	29.80±4	

T-test has been done for statistical significant at $\alpha < 0.05$.

Based on the information from table 9, coffee consumption did not effect on BMI changes therefore, Coffee consumption has been investigated on the height and found significant effect on the reduced height (*P*=0.04) (Table 10). However, coffee has no effect on the appetites (Table 11).

Table 10: effect of coffee consumption on the height:

		Height cm	P values
		Mean± SD	
coffee consumption	yes	167.47± 7	0.04
	no	171.47±6	

T- test has been done for statistical significant at $\alpha < 0.05$.

Table 11:effect of coffee consumption on appetites:

		Usual weight			Usual body mass index		
		is there any effect of the coffee on the appetite			is there any effect of the coffee on the appetite		
		reduce the appetite	increase the appetite	no effect	reduce the appetite	increase the appetite	no effect
		Mean± SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD
Coffee consumption	yes	78.39±	80.25±	86.68±	28.30±	28.66±	31.18±
	no	78.00±	.	86.30±	26.96±	.	28.79±

Discussion:

In recent years coffee consumption received a lot of challenges whether its consumption will have positive or negative effect on body weight.

The present study shed the light on the coffee consumption and body weight status, women was more involved in the study than man by which 53.5% vs 46.5% in which more than 50%, this probably due to traditional or habits of Libyan coffee drinks at home. The young people aged between 20-30 years were more involved in study due to young people presented about one third of Benghazi population according to censuses 2012. These condition might be different with other result by which old or middle age adult were more involved (20-22).

Coffee consumption and body weight changes were focusing of many researchers (1,2,5,7,9,10). In the current work, there were 95% of the participant involved in body weight reduction program drink coffee with particular significant 1 cup to 2 cups a day and favorite coffee drink was Arabic coffee ($P < 0.05$). In contrast with other works there were different coffee brands have been drunk and this include traditional prepared coffee with several cups 3-6 a days were shown positive effect on body weight (23,24).

In regard the questions about effect of coffee consumed on appetite, the result of the present study found that, 52.9% of respondents answers were coffee have no effect on appetite. However, about 43.2% of the participants have answered coffee consumed do have decreased the appetite. The result of the present study was inconsistent with work done by Gavrieli and et al, and Wynne and et al (11, 18) and found that coffee consumption did not affect the appetite. Coffee were not shown to reduce appetite rather than reduce

body weight. In numbers of studies coffee cloud help reduced body weight through increase energy or fuel oxidation(1, 7, 8) . The most common of our subjects preferred to drink coffee in the morning (47.1%) (P=0.00) and about 58% preferred to drink coffee with sugar (P=0.03). Furthermore, more of the respondents have had eaten main daily meals (58%) (P=0.03). Coffee was found to exert an effect as consumption of a moderate amount in the morning, providing 6 mg of caffeine/kg body weight (equivalent to two to four cups), significantly reduced energy intake in the lunch, compared to a lower or no intake, and this effect was maintained during the rest of the day (25).

The important finding in the current work was that coffee consumption has been found strongly assistant in reduce body weight ($p< 0.05$) in man but not in women. This could be probably due to potential mechanisms that may explain these hypotheses could be related to the appetite hormones and glucose metabolism markers (26). It is known that overweight/obese individuals have different metabolic and/or hormonal profiles compared to normal-weight individuals (27,28) and thus, they may respond differently to dietary factors, like coffee, that can affect appetite hormones and glucose metabolism (29,30). Another potential explanation might be a potentially different rate of caffeine metabolism between the two groups, if the results are mainly attributed to caffeine (31). Furthermore, there also important highlighted in this study was that, coffee consumption significant reduced height but not body mass index in both male and female. It well known that coffee contain functional food and bioactive compounds such as caffeine which could interfering with bone remodeling and effect peak bone mass through increased urinary excretion of calcium and phosphorus (32, 33). By definition of BMI in which weight divided meter square of height which mean height is inverse relationship with BMI, decreased height increased led to increased BMI and this was in our case why BMI not changes or could increase in those coffee consumption participants.

Coffee consumption and body weight status still receiving a lot challenges. Effect of coffee consumption on weight and height but not on BMI, was newly finding according to our knowledge . There was a number of studies revealed that coffee consumption has negative effect on body weight (34, 35). On the other hands, as several studies were found either coffee consumption induced weight gain or have not effects (36, 37). Interestingly, women have found drink more coffee than man and significantly drink 2 cup per day which found strongly decelerating or slowest weight loss in female and this is the fact could be explained by increased coffee consumption maintaining the body weight or significantly associated with an increased risk in women (36).

In sum, coffee consumption assistant in weight reducing in man and decelerating or slowest weight loss in female with an average 2 cup per day. Further work need to be perform on large sample to established the effectiveness of coffee on body weight. Its recommended that coffee consumption should be consumed at recommended levels 3 cup/day to avoid ill-health and people on weight reducing program should aware of coffee consumption that 2 cup/day assistant for their weight loss.

Conclusion:

Coffee consumption has been shown assistant in body weight loss in male and decelerating or slowest weight loss in female and not effect on the appetite. However, coffee consumption significant reduced height but not body mass index in both women and man. There were 95% of the participant involved in body weight reduction program drink coffee with particular significant one cup a day and favorite coffee drink was Arabic coffee.

The most common of our subjects preferred to drink coffee in the morning and preferred to drink coffee with sugar. Furthermore, more of the respondents have had eaten main daily meals. Our study need to be investigated in large sample sizes.

Acknowledgment

We are grateful to all subjects who participated in the study.

Conflict of Interest

No conflict of interest.

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