Volume (25), No. (4) - (November)/(2025)

Does Drinking Coffee Affect Body Weight Among University Students?

"هل يؤثر شرب القهوة على وزن الجسم بين طلاب الجامعات؟"

Saida Al-Shnaigat, Sana Al-Shnaigat, hadeel obeidat, Haneen Tarawneh
جامعة جرش
s.shnaqat@jpu.edu.jo, sanashnaigat@yahoo.com, h.obedat@jpu.edu.jo, H.tarawneh@jpu.edu.jo

*(Corresponding author) e-mail: s.shnaqat@jpu.edu.jo

الملخّص

القهوة مشروب شائع يتمتع بالعديد من الفوائد الصحية، بما في ذلك تحسين الانتباه والتركيز وزيادة استهلاك الطاقة. قد يرتبط استهلاك القهوة بشكل أكبر بانخفاض خطر الإصابة بمرض السكري من النوع الثاني، وأمراض القلب والأوعية الدموية، وأنواع معينة من السرطان، ومرض باركنسون، والوفاة. يمكن أن يساعد الكافيين في فقدان الوزن من خلال تثبيط عمل إنزيم الفوسفوديستيراز ومنع التأثيرات الضارة للأدينوزين على زيادة إفراز النورأدرينالين، مما يعزز عملية تحلل الدهون (الليبوليسيس). كما يمكنه تنظيم وزن الجسم، وخصوصاً لدى الأطفال والمراهقين.

هدفت هذه الدراسة إلى استكشاف العلاقة بين استهلاك القهوة ومؤشر كتلة الجسم (BMI) لدى طلاب كلية الزراعة الذكور في جامعة جرش الأهلية. بالإضافة إلى قياس انتشار زيادة الوزن والسمنة بين عينة الدراسة. استخدمت الدراسة تصميماً مقطعياً شمل 150 طالباً، وأجريت قياسات أنثروبومترية. تم حساب حجم العينة بناءً على العدد الإجمالي للطلاب الذكور في كلية الزراعة في عام 2023، حيث بلغ الحد الأدنى لحجم العينة 150 طالباً.

شارك في الدراسة مجموعة من 150 طالباً من كلية الزراعة في جامعة جرش، طُلب منهم تعبئة استبيانات ذاتية حول عادات استهلاك القهوة والبيانات الغذائية. تضمنت الاستبيانات بيانات سكانية واجتماعية مثل العمر، ومستوى النشاط البدني، وعادات التدخين، بالإضافة إلى قياسات أنثروبومترية. كما تم تقييم المشاركين من حيث مؤشر كتلة الجسم (BMI)، وتم تصنيفهم ضمن الفئات: نقص الوزن، الوزن الطبيعي، زيادة الوزن، أو السمنة. تم جمع البيانات الغذائية من خلال استبيان نوعي لتكرار استهلاك الطعام، تضمن عناصر غذائية من مجموعات غذائية مختلفة، وطُلب من المشاركين تحديد تكرار تناول الأطعمة وحجم الحصص لكل مجموعة غذائية.

تم تحليل البيانات باستخدام برنامج SPSS الإصدار 20، واختبارات كاي تربيع (square-Chi). كما تم استخدام نموذج الانحدار الخطي لتحليل العلاقة بين استهلاك القهوة والسمنة. تم قياس استهلاك القهوة باستخدام ثلاثة مؤشرات: تكرار الاستهلاك (مثل كوب واحد/مرة يومياً... إلخ)، حجم أكواب القهوة (صغير، متوسط، كبير)، ومدة تاريخ شرب القهوة (عدد السنوات منذ بدء استهلاك القهوة).

أظهرت النتائج أن 76 من المشاركين لا يمارسون التمارين الرياضية، و91.3 ليس لديهم أمراض، و65.3 مدخنون، و58 من المشاركين مصنفون على أنهم يعانون من السمنة بناءً على مؤشر كتلة الجسم، في حين أن 74 صنفوا ضمن فئة "منخفضي الخطر" بناءً على محيط الخصر. كما كشفت النتائج عدم وجود فروق ذات دلالة إحصائية بين فئات مؤشر كتلة الجسم وفئات محيط الخصر من حيث كمية القهوة المستهلكة أو حجم الأكواب أو مدة الاستهلاك، مما قد يشير إلى عدم وجود تأثير لتلك العوامل على حالة وزن الجسم.

هناك حاجة لمزيد من الأبحاث لأخذ نوع القهوة وعوامل ومتغيرات أخرى بعين الاعتبار لتحسين دقة النموذج. تساهم هذه النتائج في تعزيز الفهم حول الدور المحتمل للقهوة في التحكم بالوزن بين طلاب الجامعات.

ABSTRACT

Coffee is a popular drink with numerous health benefits, including improved alertness, concentration, and energy expenditure. Higher coffee consumption may be linked to a lower risk of type 2 diabetes, cardiovascular disease, some types of cancer, Parkinson's disease, and mortality. Caffeine can help people lose weight by blocking the actions of the enzyme phosphodiesterase and preventing adenosine's detrimental effects on enhanced noradrenaline release, which encourages lipolysis. It can also regulate body weight, particularly in children and adolescents. This study aimed to explore the association between coffee consumption and BMI among male students in the faculty of agriculture at Jerash Private University, as well as the prevalence of overweight and obesity among the study sample. The study used a cross-sectional design, including 150 male students, and anthropomorphic measurements. The sample size was calculated based on the total number of male students in the faculty of agriculture in 2023, with a minimum sample size of 150. The study involved a group of 150 agriculture students in Jerash, who were asked to complete self-filled questionnaires about their coffee consumption habits and dietary data. The questionnaires included socio-demographic data, such as age, physical activity, and smoking habits, as well as anthropometric measurements. The participants were also assessed for their body mass index (BMI) and were categorized as underweight, normal weight, overweight, or obese. Dietary data was collected through a qualitative food frequency questionnaire, which included food items from different food groups. Participants were asked to select the frequency of food consumption and the serving size in each food group. The data was analyzed using SPSS version 20 and chi-square tests. A linear regression model was used to investigate the association between coffee consumption and obesity. Consumption of coffee were measured using three parameters: frequency of coffee consumption (one cup/once per day etc), coffee cup sizes (small, medium, large) and the duration of coffee consumption history (years since starting to drink coffee).

The results showed that 76% of the participants were not engaging in exercise, 91.3% did not have diseases, 65.3% were smokers, 58% of the participants were classified as obese based on BMI, while 74% fell into the

Article history:

Submission Date: 22/07/2025

Reviewing Date: 25/08/2025

Revision Date: 14/10/2025

Acceptance Date: 21/10/2025

Publishing Date: 13/11/2025

DOI: 10.6520/4k5px783

Keywords:

Coffee, Body weight, BMI

Funding:

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Competing interest:

No competing interests exist.

Cite as:

Al-Shnaigat, S. et al. (2025) Does Drinking Coffee Affect Body Weight Among University Students?. Jersah for Research and Studies 25 (4). https://doi.org/10.6520/4k5px783.

"no risk" category based on waist circumference. Also, the results revealed that there were no significant differences in the between both BMI categories and WC categories in the prevalence of amount of coffee consumed, cup sizes or timing, which may indicate no effect of all of them in the body weight statues. further research is needed to consider the effect of coffee type and other factors and variables to improve the model's fit. These results contribute to the understanding potential role of coffee in weight control among university students.

Vol. 25, No. 1, pp. x-x | DECEMBER 2025
DOI:
https://doi.org/10.9622/jrs.v25i01

Does Coffee Consumption Associated with Body Weight Among University Students?

Saida Fuad Al-Shnaigat[1], Sana Fuad Al-Shnaigat[2], Hadeel Mohammad Obeidat[3*], Haneen Nayef Tarawneh[4]
[1,3,4] Department of Food and Nutrition Science, Faculty of Agriculture, Jerash Private University, Postal code 26250, Jerash, Jordan
[2] Institute for Family Health /Noor Al- Hussein Foundation, Amman, Jordan
*(Corresponding author) e-mail: h.obedat@jpu.edu.jo

***Article history** (leave this part):*
Submission date: 12 Dec 2023
Received in revised form: 11 March 2024
Acceptance date: 23 April 2024
Available online: 1 August 2024

Keywords:
Coffee, Body weight, Body Mass Index, Waist circumference, Obesity.
Funding:
This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Competing interest:
The author(s) have declared that no competing interests exist.

***Cite as** (leave this part):*

ABSTRACT

This study aimed to examine the relationship between coffee drinking habits and body weight among male students at Jerash Private University by assessing their Body Mass Index (BMI) and waist circumference. Coffee, widely consumed globally, has caffeine and other bioactive components that may influence metabolic activity and potentially affect weight gain. To explore this, 150 male students from the Faculty of Agriculture completed a self-administered socio-demographic and coffee consumption questionnaire. Anthropometric measurements were taken to classify participants into underweight, normal weight, overweight, and obese categories following WHO guidelines.

The average age of participants was 26.7 years, with a mean BMI of 26.29 kg/m², reflecting a 58% prevalence of obesity within the sample. Analysis showed no significant differences in coffee consumption or timing across BMI and waist circumference categories, suggesting that coffee intake does not directly influence body weight in this population. Further, analysis of variance indicated a weak relationship between coffee consumption and both BMI and waist circumference, supported by low β coefficient values.

These findings suggest that coffee consumption among university students may have a negligible effect on body weight despite its widespread use. Factors such as added sugar in coffee or low physical activity levels might play a more significant role in weight status. Given the high obesity rate observed, further research is essential to identify other lifestyle and dietary factors affecting weight and to guide effective obesity management strategies. This highlights the need for targeted health promotion programs focusing on physical activity and obesity prevention among students.

1.1 Introduction:

Coffee is among the most popular beverages globally, commonly prepared via brewing or espresso techniques (Al-Shnaigat & Obeidat, 2022) . For many individuals, coffee serves as their primary source of caffeine, and it also contains bioactive compounds such as polyphenols and chlorogenic acid that have been associated with several health benefits (Lee et al., 2019; Grosso et al., 2017). Unlike ketotifen, caffeine is a methylxanthine stimulant that enhances alertness, and It also functions as an energy-expenditure stimulant, increasing thermogenesis and fat oxidation (Al-Areefy & Alattas, 2023). At the cellular level, caffeine exerts its effects by blocking adenosine receptors (especially A_1 and A_2A) and inhibiting phosphodiesterase, leading to increased intracellular cAMP, elevated catecholamine release, enhanced lipolysis, and accelerated metabolic rate (Fredholm et al., 2005; Boswell-Smith et al.,2006; Yoneshiro et al.,2015), supported by evidence of thermogenic effects in brown adipose tissue in both animals and humans (Yoneshiro et al.,2015). Studies also show that caffeine and related coffee compounds stimulate lipolysis via hormone-sensitive lipase activation and inhibit digestive lipid absorption, further supporting its metabolic effects (Muzammil et al.,2021). Numerous recent experimental and epidemiological studies have highlighted that coffee consumption may confer significant health benefits, especially concerning cardiometabolic risk factors (Godos et al.,2014; Corbi et al,2023). Regular coffee intake appears to be linked to a lower risk of type 2 diabetes, cardiovascular disease, and metabolic syndrome, which refers to the clustering of cardiovascular risk factors—such as insulin resistance, dyslipidemia, obesity, and hypertension —that together significantly elevate the likelihood of heart disease and diabetes."(Godos et al.,2014; Corbi et al,2023). This potential protective effect is attributed to coffee's bioactive compounds, which activate human detoxification and defense enzyme systems and demonstrate anti-inflammatory properties in laboratory settings (Godos et al., 2014).

Obesity occurs when excess body fat accumulates, potentially compromising an individual's quality of life. Its escalating prevalence has evolved into a critical public health emergency (Yee et al., 2023). This condition is linked to a range of disorders, including coronary heart disease (CHD), type 2 diabetes mellitus (T2DM), and various cancers (Tabrizi et al., 2019). Coffee—one of the world's most popular beverages—is celebrated not only for its aroma and energizing properties but also for its potential health impacts. Central to these effects are its bioactive constituents, especially caffeine and chlorogenic acids, which have been the focus of

extensive research. These compounds are thought to influence metabolism, body weight regulation, nutrient absorption, and gut health, elevating coffee's role beyond that of a daily pick-me-up. Research suggests that caffeine may enhance metabolic rate by increasing energy expenditure and fat oxidation, which could aid in weight management (Chien, 2024).Yet, the practical impact on human weight is modest. A 2017 meta-analysis of randomized controlled trials ($N \approx 606$) reported that doubling caffeine intake correlated with approximately 22% weight reduction, 17% decrease in BMI, and 28% fat mass loss (Heckman, 2010). Similarly, a 2019 meta-analysis of cross-sectional studies ($N \approx 207{,}551$) found small inverse associations between coffee consumption and adiposity, particularly among men (BMI reduction ~0.08 kg/m²; waist circumference reduction ~0.27 cm) (Van Schaik et al.,2021). However, observational and longitudinal studies show inconsistent findings. For instance, the Danish MONICA cohort ($N \approx 2{,}128$) followed participants over 11 years, finding that increased coffee intake was associated with slightly smaller concurrent gains in BMI, fat mass index, body fat percentage, and waist circumference (−0.05 kg/m² BMI per additional cup/day); yet baseline intake did not predict subsequent adiposity changes, and the overall associations were weak (Jørgensen, 2017) .broader cross-sectional meta-analysis also found no significant association between coffee intake and obesity overall (OR ~1.11), while gender-stratified analyses revealed a positive association with obesity among women (OR ~1.84) but negligible effects in men (Elwenspoek et al., 2024).

Despite these inconsistencies, several biologically plausible mechanisms support a potential anti-obesity effect of coffee: enhanced lipolysis, thermogenic activation of brown adipose tissue, inhibition of lipid digestion, and modulation of nutrient-sensing pathways such as mTOR, AMPK, and calcium-mediated autophagy (Van Schaik et al.,2021). Yet, habituation over time may blunt these effects, limiting long-term weight impact despite metabolic stimulation (Dulloo et al.,1989; Van Schaik, 2021).

Given the existing literature, substantial gaps persist—especially when focusing on university students in the Middle East, such as those in Jordan. Available studies often evaluate body mass index (BMI) or waist circumference in isolation and seldom consider independent male cohorts, limiting the relevance of findings to specific student populations. Most evidence derives from mixed demographic groups, reducing its generalizability to university settings. The significance of this study lies in its capacity to address these shortcomings by concentrating on an understudied demographic—agricultural students at Jerash Private University—whose lifestyle behaviors and health outcomes may differ from those of the broader population. Therefore, this study aims to both assess the relationship between coffee

consumption and BMI and determine the prevalence of overweight and obesity within this cohort. By focusing on a specific, contextualized group and measuring both BMI and obesity rates, the study fills a clear void in the regional and demographic literature.

2. Materials and Methods

2.1 Study Design and Data Collection

A cross-sectional study was conducted by recruiting 150 random male students from agricultural college of Jarash private university.

The sample size was calculated by calculator Raosoft (online certified website for calculating sample size, https://www.calculator.net/sample-sizecalculator.html?type=1&cl=80&ci=5&pp=50&ps=210&x=78&y=19) based on the total number of male students in the faculty of agriculture in Jerash University in 2023 which was 491. With a 5% margin of error, 85% CI, and 50% response distribution, and after the addition of 10%, the minimum sample size was 150.

Randomization was conducted based on students' number that were selected randomly from the list of the students names that were provided from the registration section in the university.

The inclusion criteria included being an undergraduate student in the faculty of agriculture at Jerash Private University, possessing the awareness and ability to understand and respond accurately to the questions, and willingness to participate in the study and expressed their agreement orally, Whereas, the exclusion criteria were all the female students in the faculty of agriculture at Jerash Private University.

The Institutional Review Board at Jerash Private University (No. 2025/2024/5/2) reviewed and approved the study in accordance with the Declaration of Helsinki. A written consent form was distributed to the participants who decided to contribute, and their approval were taken orally. self-filled questionnaires were distributed to the participants to collect sociodemographic data like age, physical activity, and smoking habits.

Then, a trained nutritionists collected anthropometric data through face-to-face interviews that conducted between November and may in 2023. Anthropometric measurements included weight (in kilograms), height (in centimeters) and and waist circumference (cm).

Body height was measured using stadiometer (Height Measurement Medical Portable Stadiometer Height Rod 8-82 inch/20-210 cm/Unit with cm & inch, Accurate Scale Height Measuring Tool for Office Home Wall Adults), where the subjects had no shoes on to ensure accuracy in measuring the height. The stadiometer also contained a digital scale Where it was used to take students' weights.

The measurements were recorded to the nearest 0.1 cm and 0.1 kg, respectively. Waist circumference (WC) was measured to the nearest 0.1 cm, by flexible ruler sewing tape (High Quality 120in/300cm Body Measuring Ruler Sewing Tailor Tape Measure Centimeter Meter Sewing Measuring Tape Soft Ruler). (Nieman, 2019). WC was divided into two category which were "risk' and "No risk" according to the cut-off point for WC (<88 cm for women and <102 cm for men) (Bohmann, et al., 2024).

Body mass index (BMI) (kg/ m2) was then calculated, and subjects were categorized as underweight (<18.5), normal weight (18.5-24.9), overweight (25-29.9), or obese (> 30) according to the international classification used by the World Health Organization WHO (2000).

A reliable, valid questionnaire for coffee consumption was used (Loftfield, et al., 2015). The questionnaire was translated into arabic, and re-translated into english again to make sure the translation is accurate, and tested for reliability with alpha cronbach value 0.75.The questionnaire included questions about amount of coffee consumed, frequency, and duration (how long has it been since the participant started drinking coffee).

2.2Statistical analysis

The data were analyzed using Statistical Package for the Social Sciences (SPSS) version 20 (IBM, Chicago, IL, USA). Frequencies and percentages were used to present categorical variables, while means and standard diffusion were used to present continuousvariables through descriptive statistics. Chi-square tests were used to assess the differences between categorical variables. Whilelinear regressionmodel used to investigate the relationship between coffee consumption habits and Body weight through assessing Body Mass Index (BMI) categories, as well as (WC) categories. The statistical significance was set at $p<0.05$

3. Results

Table 1 presents the general characteristics of the study sample. A total of 150 male students from Jerash participated in this study. The mean age of the participants was 26.7 years, with an average weight of 79.93 kg and an average height of 174.36 cm. The waist circumference (WC) average was 92.88 cm, and the body mass index (BMI) averaged 26.29 kg/m². Among the participants, 76% were not engaged in regular exercise, 91.3% reported no existing health conditions, 65.3% were smokers, 58% of the participants were classified as obese based on BMI, while 74% fell into the "no risk" category based on waist circumference.

The prevalence of drinking coffee, cup sizes, and timing among body mass index and waist circumference categories are shown in Table 2.There were no significant differences in the

between both BMI categories and WC categories in the prevalence of amount of coffee consumed, cup sizes or timing, which may indicate no effect of all of them in the body weight statues. However, almost one third of the participants in the different group drinking coffee 2 or more times per day (28.6% of nonobese; 32.2% of obese; 27.9% with no risk and 38.5% with high risk) , and almost half of them use medium size coup (44.4% of nonobese; 58.6% of obese; 52.3%

Table 1. The general characteristics of the study population (n=150).

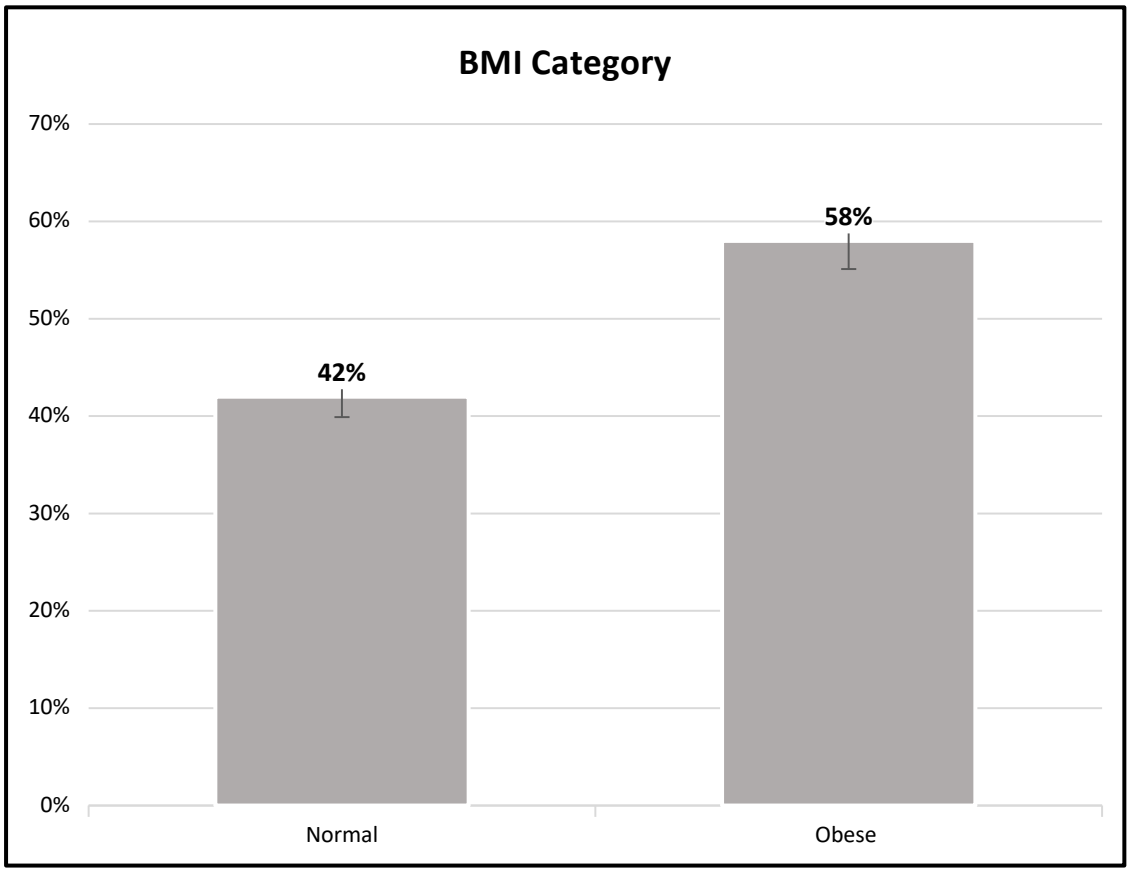
Variables	Mean ± SD
Age (years)	26.69 ± 7.44
Weight (kg)	79.93 ± 18.175
Height (cm)	174.36 ± 7.258
Waist circumference (cm)	92.88 ± 13.807
Body mass index (kg/m^2)	26.29 ± 5.782
	n (%)
Exercises	
Yes	36 (24%)
No	114 (76%)
Smoker	
Yes	98 (65.3%)
No	52 (34.7%)
Disease	
Yes	13 (8.7%)
No	137 (91.3%)
Body mass index Category	
Non-obesity	63 (42%)
Obesity	87 (58%)
Waist circumference Category	
No risk	111 (74%)
High risk	39 (26%)

with no risk and 53.8% with high risk), andthey had been drinking coffee for more than 5 years for (36.5% of nonobese; 44.8% of obese; 41.4% with no risk and 41% with high risk).

Moreover, most participants reported adding sugar to their coffee (50.8% of non-obese, 44.8% of obese, 51.4% with no risk, and 35.9% with high risk), while the majority did not add cream

(95.2% of non-obese, 96.6% of obese, 96.4% with no risk, and 94.9% with high risk) or milk (87.3% of non-obese, 88.5% of obese, 87.4% with no risk, and 89.7% with high risk).

The results were supported by a linear regression analysis that used BMI or WC as dependent variables, while coffee consumption, cup sizes, and coffee timing served as independent variables,as presented in Table 3. No significant results were reported. The correlation between BMI and other factors was weak, ranging from 0.026 for coffee consumption to 0.078 for the duration of coffee consumption. Additionally, the changes in BMI, whether increases or decreases, were minimal because of variations in the studied factors. The **β** coefficients ranged from -0.059 for added sugar to 0.081 for coffee cup sizes. The percentage change in BMI due to these factors was also minor, ranging from 0% for adding milk to 0.7% for coffee cup sizes. A similar result was reported for WC. The correlation between WC and various factors was also weak, ranging from 0.008 for drinking coffee to 0.136 for adding sugar. Additionally, the **β** coefficients varied from -0.136 for adding sugar to 0.034 for adding cream leading to a % of change ranged from 0.0%-1.8%.



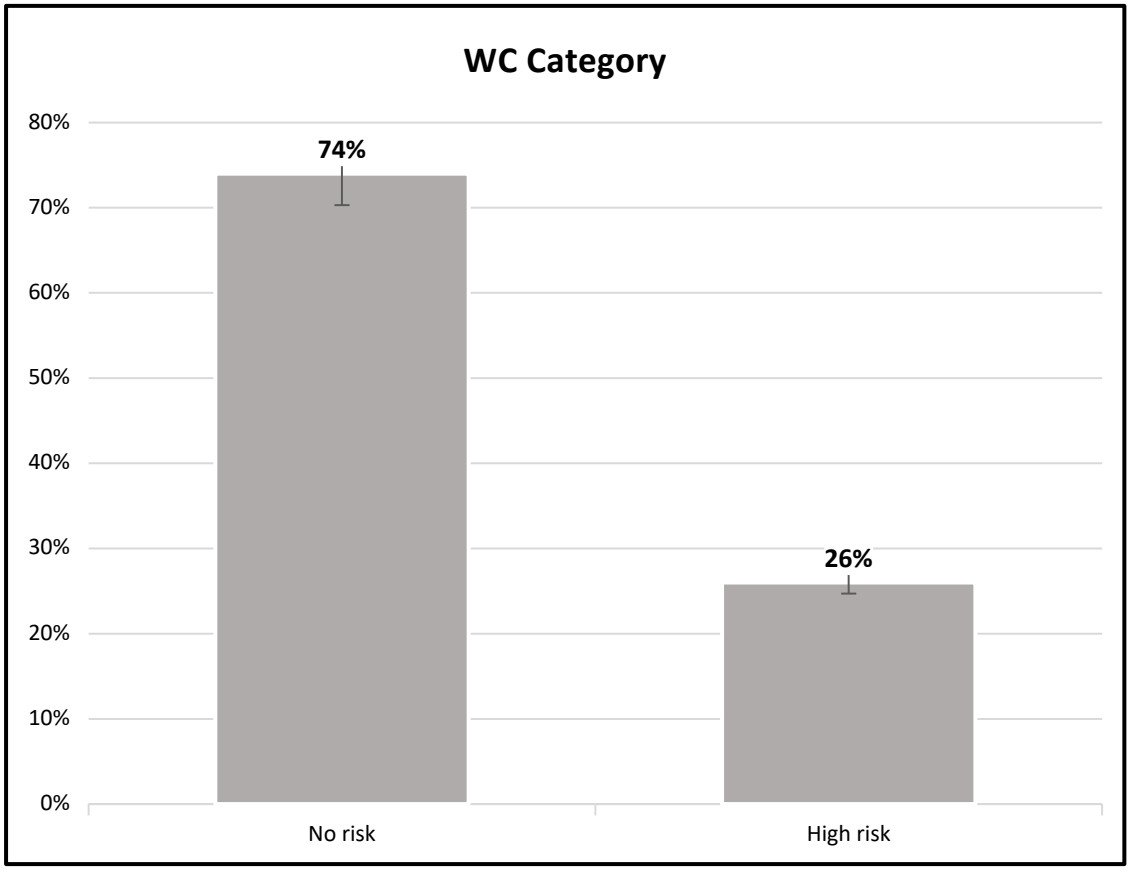


Figure 1. Obesity distribution among the study sample as body mass index and waist circumference categories, and WC

The Figure 1 shows that "obesity" is the most common BMI category in our sample, representing 58%. In contrast, the most common waist circumference (WC) category is "no risk," accounting for 74%

Table 2. The prevalence of drinking coffee, cup sizes, and timing among body mass index and waist circumference categories.

Independent Variables		BMI Category			WC Category		
		Non-obesity	Obesity	P-* value BMI	No risk	High risk	P-* value Waist
Drinking coffee	Never	(11.1) 7	(12.6) 11	0.895	(9.9) 11	(17.9) 7	0.189
	2-3 times a month	(9.5) 6	(11.5) 10		(11.7) 13	(7.7) 3	
	1-2 times a week	(12.7) 8	(14.9)13		(13.5) 15	(15.4) 6	
	3-4 times a week	(9.5) 6	(5.7) 5		(9.9) 11	(0) 0	
	1 a day	(28.6) 18	(23) 20		(27) 30	(20.5) 8	
	2 or more times per day	(28.6) 18	(32.2) 28		(27.9) 31	(38.5) 15	
Coffee cup sizes	He doesn't drink coffee	(9.5) 6	(10.3) 9	0.146	(9) 10	(12.8) 5	0.698
	Small	(30.2) 19	(14.9) 13		(23.4)26	(15.4)6	
	Medium	(44.4) 28	(58.6) 51		(52.3) 58	(53.8) 21	
	Large	(15.9) 10	(16.1) 14		(15.3) 17	(17.9) 7	
Since when you drink coffee	He doesn't drink coffee	(9.5) 6	(11.5) 10	0.091	(9) 10	(15.4) 6	0.230
	Less than 1 year	(19) 12	(5.7) 5		(14.4) 16	(2.6) 1	
	1-2 years	(11.1) 7	(18.4) 16		(13.5) 15	(20.5) 8	
	3-4 years	(23.8) 15	(19.5) 17		(21.6) 24	(20.5) 8	
	More than 5 years	(36.5) 23	(44.8) 39		(41.4) 46	(41) 16	
Adding Sugar	No	(49.2) 31	(55.2) 48	0.470	54 (48.6)	52 (64.1)	0.096
	Yes	(50.8) 32	(44.8) 39		57 (51.4)	14 (35.9)	
Adding Cream	No	(95.2) 60	(96.6) 84	0.685	(96.4) 107	(94.9) 37	0.676
	Yes	(4.8) 3	(3.4) 3		(3.6) 4	(5.1) 2	
Adding Milk	No	(87.3) 55	(88.5) 77	0.823	(87.4) 97	(89.7) 35	0.697
	Yes	(12.7) 8	(11.5) 10		(12.6) 14	(10.3) 4	

* The value is considered significant at $p<0.05$.

BMI: body mass index; WC: waist circumference.

Table 3. Linear regression analysis using Body Mass Indexand Waist circumferences as dependent and Drinking coffee (one cup/once), coffee cup size, and when you drink coffee as independent.

Varibales	R	R Square Change	% of change	*p-value for change	Beta Coefficients	95% Confidence Interval for B	*p-value for B
BMI							
Drinking coffee	0.026	0.001	0.1%	0.756	-0.026	(-0.053, 0.038)	0.756
Coffee cup sizes	0.081	0.007	0.7%	0.325	0.081	(-0.048, 0.142)	0.325
Since when you drink coffee	0.078	0.006	0.6%	0.344	0.078	(-0.030, 0.086)	0.344
Adding Sugar	0.059	0.003	0.3%	0.473	-0.059	(-0.219, 0.102)	0.473
Adding Cream	0.033	0.001	0.1%	0.688	-0.033	(-0.492, 0.326)	0.688
Adding Milk	0.018	0.000	0%	0.824	-0.018	(-0.223, 0.824)	0.824
WC							
Drinking coffee (one cup/once)	0.008	0.000	0.0%	0.918	-0.008	(-0.043, 0.038)	0.918
Coffee cup sizes	0.016	0.000	0.0%	0.847	0.016	(-0.076, 0.093)	0.847
Since when you drink coffee	0.009	0.000	0.0%	0.913	-0.009	(-0.055, 0.049)	0.913
Adding Sugar	0.136	0.018	1.8%	0.098	-0.136	(-0.261, 0.022)	0.098
Adding Cream	0.034	0.001	0.1%	0.678	0.034	(-0.287, 0.440)	0.678
Adding Milk	0.032	0.001	0.1%	0.699	-0.032	(-0.262, 0.176)	0.699

* The value is considered significant at $p<0.05$.

BMI: body mass index; WC: waist circumference.

4. Discussion

Some studies have found that caffeine has effect on weight reduction while other studies have proven the opposite, which in turn create diverse views.

The present study was applied among male agriculture students at Jerash Private University (N=150). The results showed that there were no significant differences between both BMI

categories and WC categories in the prevalence of amount of coffee consumed, cup sizes or timing, which may indicate no effect of all of them in the body weight statues.

Al-Areefy and Alattas (2023) conducted a research that included 180 male and female students at Jazan University to examine the relation between caffeine intake from Arabic coffee, other dietary sources and BMI. Most of the participants had caffeine intake from Arabic coffee (74%). The results of their study revealed that an underweight participants (≤18.4 kg/m2) were high caffeine consumers. This is close to the results of current study which showed that 37.5% of the underweight participants drank coffee at least once a day.In the study of Al-Areefy and Alattas (2023), they found that the relationship between BMI and caffeine intake was insignificant(p-value= 0.035), and these results goes along with the results of the current study which also showed an insignificant association between frequency of coffee consumption and BMI (p-value= 0.035). This is could be explained by the existance of confounding factors that affect BMI. Coffee drinkers might differ in other ways that affect BMI like adding sugar, cream, or syrups (which may increase calorie intake). Coffee drinkers might also have different diets, sleep habits, or activity levels that weren't fully controlled for in the study. Forthermore, this is could be explained because of the variation in coffee type and consumption habits, as for black coffee, it has almost no calories, while flavored or sweetened coffee drinks can be high in calories, and since the study lumped all types of coffee together, the effects might cancel each other out, showing no overall association.

On the other hand, and in contrast to the results of the present study, in a meta-analysis of observational epidemiologic studies that was established by Lee and her colleagues (2019) they found that higher coffee intake was significantly associated with modestly lower BMI and WC in men but not in women. They proposed several mechanisms that could help explain the anti-obesity effect of coffee. One of these theories assumes the anti-obesity role of the coffee specially in reducing fat stores in obese animals and humans by several mechanisms like inhibiting the multiplication of adipocyte, affecting the transcription factors that involve in the production of lipids in these cells, and influencing gastrointestinal bacteria which has a role on obesity (Tamura, 2020; Sirotkin, and Kolesarova, 2021).Other theory suggests that supplemental green bean coffee extract with 500 mg/day of chlorogenic acid lowers body weight since it regulate glucose and lipid metabolism and help in inhibition of lipidabsorption. (Kanchanasurakit et al., 2023).A thired theory proposed that trigonelline could inhibit adipocyte proliferation and lipid accumulation in differentiation adipocytes based on in vitro study Ilavenil et, al., 2014). Furthermore, in their systematic review, Tabrizi and her colleagues (2019) demonstrated that caffeine consumption resulted in a significant decrease in weight,

BMI and body fat. They justified the effect of caffeine by its ability to increases both noradrenaline and dopamine release, therefore stimulating the neuronal activity in several brain regions (Zheng & Hasegawa, 2016), which in turn decrease weigh and body fat.

In a study about the relationship between long term coffee consumption and the components of the metabolic syndrome in a relatively healthy Dutch study population (averaged over a period from the age 27 till the age 42 years old), The results showed that the association between waist circumference and high coffee consumption was positive but statistically insignificant (Balk, et al., 2009). These results are close to the results of the present study that showed that the correlation between WC and various factors was also weak, ranging from 0.008 for drinking coffee to 0.136 for adding sugar. Also, in another cross-sectional study which was completed in the non-institutionalised US population aged 18 years and older.

They explore the association between coffee consumption and BMI, and they found that frequency of coffee/tea consumption was not associated with measures of obesity, and that artificial sweetener used within coffee/tea was associated with higher BMI (Bouchard et al., 2010). In addition, the results of the Bouchard's study showed that the use of artificial sweetener was associated with obesity, and that unadjusted mean BMI values were not significantly different across coffee and tea frequency groups which is similar to the results of the current study in that most of the participants in the present study reported adding sugar to their coffee (50.8% of non-obese, 44.8% of obese), and that there were no significant differences in the between both BMI categories and WC categories in the prevalence of amount of coffee consumed, cup sizes or timing. As a matter of fact this (adding sugar to their coffee) seems to be the main reason why coffee consumption didn't affect neither the BMI nor waist circumferences significantly of the study population in the in present study.

There are several factors that affect body weight and BMI such as genetics, dietary Habits, socioeconomic and environmental factors, physical activity. Regarding physical activity, most of participants in current study (76%) were not engaged in regular exercise. Other factors include hormonal and metabolic factors, and this is one of the reasons female participants were excluded from the present study. Also, other factors that may influence body weight and BMI existing of health conditions and using of medications. Most of the participants (91.3%) reported no existing health conditions.

5. Limitations

The current study was limited by the cross-sectional design, which disallowed a causality assumption. Another limitation was the single-collage data collection and small sample sizes,

as well as considering only the male students. In addition, it should be noted that the data in this study lack information about the type of physical activity, meal timing, sleeping hours and number of meals during the day, as well as food preparation methods.

6. Conclusion

The current results indicate that obesity is prevalent (58%) among agricultural male students. There were no significant differences in the between both BMI categories and WC categories in the prevalence of amount of coffee consumed, cup sizes or timing, which may indicate no effect of all of them in the body weight statues. This could be explained by the fact that most of the study participants added sugar to their coffee which may influence the coffee ability to reduce weight. Also, this may indicate that other factors may affect their weight such as sleeping hours, type of physical activity, the preparation method of food, meal timing, and frequency. Therefore, we recommend further studies with larger samples and including both genders, as well asincluding students from more than one collages in the university to collect a sufficient database that can be relied on to set a recommendation for these groups of people to improve their life quality and health.

7. ACKNOWLEDGEMENTS

We gratefully acknowledge all the study participants, as well as the nutrition lab supervisor (Rakhaa Saleh Alabbadi) and the nutritionist (Ahmad Aslaih) who took anthropometric measurements for the participants.

8. References:

[1] Al-Areefy, A.,&Noor A. Alattas, N. (2023). Dietary caffeine intake and BMI among a sample of students in Jazan University. *Egyptian Journal of Nutrition*, *38* (4), 42-49.

[2] Alattas, A. (2023). Dietary Caffeine Intake and BMI of Female Students in Jazan University. *Egyptian Journal of Nutrition, 38*(4), 42-49.

[3] Al-Shnaigat, S., & Obeidat, H.(2022). The Effect of Consuming Coffee from Different Preparation Methods on Body Lipids Profile. *Jordan Journal of Agricultural Sciences, 18*(3), 231-244.

[4] Balk, L., Hoekstra, T.,&Jos Twisk, J. (2009). Relationship between long-term coffee consumption and components of the metabolic syndrome: the Amsterdam Growth and Health Longitudinal Study. *European Journal of Epidemiology,24*, 203–209.

[5] Bohmann, P., Stein, M., Amadou, A., Baurecht, H., Fervers, B., Fontvieille, E., Freisling, H., Friedenreich, C., Konzok, J., Peruchet-Noray, L., Leitzmann, M., Sedlmeier, A., & Weber, A. (2025). WHO guidelines on waist circumference and physical activity and their joint association with cancer risk. *Br J Sports Med, 0*,1–7. https://doi.org/10.1136/bjsports-2024-108708

[6] Bouchard, D., Ross, R.,&Janssen, I. (2010). Coffee, Tea, and Their Additives: Association with BMI and Waist Circumference. *Obesity facts, 3*(6), 345–352.

[7] Boswell-Smith, V., Spina, D., & Page, C. P. (2006). Phosphodiesterase inhibitors. *British Journal of Pharmacology, 147*(S1), S252–S257. https://doi.org/10.1038/sj.bjp.0706458.

[8] Chien, X. (2024). The Relationship Between Coffee and Weight Management.Proceedings of ICBioMed 2024 Workshop: Computational Proteomics in Drug Discovery and Development from Medicinal Plants,**https://doi.org/** 10.54254/2753-8818/74/2024.LA18887.

[9] Corbi-Cobo-Losey, M. J., Martinez-Gonzalez, M. Á., Gribble, A. K., Fernandez-Montero, A., Navarro, A. M., Dominguez, L. J., ... & Toledo, E. (2023). Coffee consumption and the risk of metabolic syndrome in the 'Seguimiento Universidad de Navarra'project. *Antioxidants*, *12*(3), 686.

[10] Dekker, M. J., & Westerterp, K. R. (2007). Effects of caffeine on energy balance and thermogenesis. *Physiology & Behavior, 91*(1), 1–5. https://doi.org/10.1016/j.physbeh.2007.03.011

[11] Dulloo, A. G., Duret, C., Rohrer, D., & Girardier, L. (1989). Coffee and ephedrine enhance thermogenesis and thermic effect of food in man. *American Journal of Physiology, 257*(5 Pt 2), R1103–R1108. https://doi.org/10.1152/ajpregu.1989.257.5.R1103

[12] Elwenspoek, M., Thom, H., Sheppard, L., Keeney, E., O'Donnell, R., Jackson, J., Roadevin, C., Dawson, S., Lane, D., Stubbs, J., Everitt, H., Watson, J. C., Hay, A. D., Gillett, P., Robins, G., Jones, E., Mallett, S., & Whiting, F. (2024). Coffee consumption, general obesity and abdominal obesity in adults: A systematic review and meta-analysis of cross-sectional studies. *Advanced Biomedical Research, 13*, 1–310.

[13] Fredholm, B. B., Bättig, K., Holmén, J., Nehlig, A., & Zvartau, E. E. (2005). Actions of caffeine in the brain with special reference to factors that contribute to its widespread use. *Pharmacological Reviews, 57*(3), 533–553. https://doi.org/10.1124/pr.57.4.4

[14] Fruh, S. (2017). Obesity: Risk factors, complications, and strategies for sustainable long-term weight management. *J Am Assoc Nurse Pract, 29*:S3-14.

[15] Godos, J., Pluchinotta, F. R., Marventano, S., Buscemi, S., Li Volti, G., Galvano, F., & Grosso, G. (2014). Coffee components and cardiovascular risk: beneficial and detrimental effects. *International journal of food sciences and nutrition*, *65*(8), 925-936.

[16] Grosso, G., Godos, J., Galvano, F.,&Giovannucci, E. (2017). Coffee, Caffeine, and Health Outcomes: An Umbrella Review. *Annu. Rev. Nutr, 37*, 131–156.

[17] Grosso, G., Stepaniak, U., Micek, A., Topor-Mądry, R., Pikhart, H., Szafraniec, K., & Pająk, A. (2025). Association of daily coffee and tea consumption and metabolic syndrome: results from the Polish arm of the HAPIEE study. *European journal of nutrition, 54*, 1129-1137.

[18] Heckman, J., Weil, J.,&Demejia, E. (2010). Caffeine (1, 3, 7-trimethylxanthine) in Foods: A comprehensive review on consumption, functionality, safety, and regulatory matters, *Journal of Food Science, 75*, 77-87.

[19] Ilavenil, S., Arasu, V., Lee, C., Kim, H., Roh, G., Park, S., &Choi, J., Mayakrishnan, V.,&Choi, C. (2014). Trigonelline attenuates the adipocyte differentiation and lipid accumulation in 3T3-L1 cells. *Phytomedicine, 21*, 758–765.

[20] Jehan, S., Zizi, F., Pandi-Perumal, SR., Wall, S., Auguste, E., & Myers, AK. (2017). Obstructive sleep apnea and obesity: Implications for public health. *Sleep Med Disord, 1*, 00019.

[21] Jørgensen, M. E., Witte, D. R., & Borch-Johnsen, K. (2017). Habitual coffee consumption and changes in measures of adiposity: A comprehensive study of longitudinal associations. *International Journal of Obesity, 41*(4), 594–601. https://doi.org/10.1038/ijo.2017.310

[22] Kerkadi, A., Sadig, AH., Bawadi, H., Al Thani, AA., Al Chetachi, W., &Akram, H. (2019). The relationship between lifestyle factors and obesity indices among adolescents in Qatar. *Int J Environ Res Public Health,16*, 4428.

[23] Lee, A., Lim, W., Kim, S., Khil, H., Cheon, E., An, S., Hong, S., Lee, D., Kang, S., Oh, H., Keum, N.,&Hsieh, C. (2019). Coffee Intake and Obesity: A Meta-Analysis. *Nutrients, 11*, 1274.

[24] Leeners, B., Geary, N.,Tobler, P., & Asarian, L. (2017). Ovarian hormones and obesity. *Human Reproduction Update, 23*, 300–321.

[25] Liu, Z., & Cui, K. (2024). The association of caffeine intake and prevalence of obesity among children and adolescents: A cross-sectional survey from NHANES 2011–2020 March. *Plos one,19*(6), e0300566.

[26] Lisanne Balk, L., Hoekstra, T. &Twisk, J. (2009). Relationship between long-term coffee consumption and components of the metabolic syndrome: the Amsterdam Growth and Health Longitudinal Study, *Eur J Epidemiol, 24*, 203–209.

[27] Loftfield, E., Freedman, ND., & Graubard, BI. (2015). Association of coffee consumption with overall and cause-specific mortality in a large US prospective cohort study. *American Journal of Epidemiology*, 182(12), 1010–1022.

[28] Maha Farag, M., Yousef, M., Ashour, M., Mansour, R., &Elmabsout, A. (2021). Coffee consumption assistant in the changes of body weight and height but not in the body mass index. *International Journal of Creative Research Thoughts,9* (9): 2320- 2882.

[29] Muzammil, A. N., Barathan, M., Yazid, M. D., Sulaiman, N., Makpol, S., Mohamed Ibrahim, N., Jaafar, F., & Abdullah, N. A. H. (2021). Lipid metabolism, disorders and therapeutic drugs – Review. *Biomolecules & Therapeutics, 29*(6), 479–489.

[30] Nieman, D. C. **(**2019**)**. *Nutritional Assessment* (7th ed.). McGraw-Hill Education.

[31]Sirotkin, A. and Kolesarova, A. (2021). The Anti-Obesity and Health-Promoting Effects of Tea and Coffee. *Physiol. Res. 70, 161-168.*

[32]Sukrit Kanchanasurakit, S., Surasak Saokaew, S., Phisalprapa, P. and Duangjai, A. (2023). Chlorogenic acid in green bean coffee on body weight: a systematic review and meta-analysis of randomized controlled trials. Systematic Reviews, 12, 163. https://doi.org/10.1186/s13643-023-02311-4.

[33] Tabrizi, R., Saneei, P., Lankarani, K., Akbari, M., Kolahdooz, F., Esmaillzadeh, A., Nadi-Ravandi, S., Majid Mazoochi, M.,&Asemi, Z.(2019). The effects of caffeine intake on weight loss: a systematic review and dos-response meta-analysis of randomized controlled trials, *Critical Reviews in Food Science and Nutrition,59*(16), 2688-2696.

[34]Tamura, H. (2020). Molecular Basis of Preventive effects of habitual coffee intake against chronic diseases. Yakugaku Zasshi, 140, 1351- 1363.

[35] Van Schaik, L., Kettle, C., Green, R., Wundersitz, D., Gordon, B., Irving, H., & Rathner, J. (2021). Effects of caffeine on brown adipose tissue thermogenesis and metabolic homeostasis: A review. *Frontiers in Neuroscience, 15*, 621356. https://doi.org/10.3389/fnins.2021.621356Frontiers+1

[36] Wang, T., Ma, X., Peng, D., Zhang, R., Sun, X., Chen, M., Yan, J., Wang, S., Yan, D., & He, Z. (2016). Effects of Obesity Related Genetic Variations on Visceral and Subcutaneous Fat Distribution in a Chinese Population. *Scientific Reports,6*, 20691.

[37] World Health Organization. (2000). *Obesity: Preventing and managing the global epidemic. Report of a WHO Consultation (WHO Technical Report Series No. 894).* Geneva: World Health Organization.

[38] Yee, L., Adrian, C., Khamki1, K., Ying, K., Shahfri, M., Hee, N., Nelly, N., Santhirasaygaran, P., Han, S., Yi, T., Herng, L.,&Loy, M. (2023). Physical Health Impacts of Obesity: Comprehensive Review, *Progress in Drug Discovery &Biomedical Science,6*, 1, a0000354. https://doi.org/10.36877/pddbs.a0000354 .

[39]Yoneshiro, T., Matsushita, M., & Saito, M. (2015). Brown adipose tissue and thermogenesis. *Frontiers in Systems Neuroscience, 9*, 150. https://doi.org/10.3389/fnsys.2015.00150

[40] Zheng, X., & Hasegawa, H. (2016). Administration of caffeine inhibited adenosine receptor agonist-induced decreases in motor performance, thermoregulation, and brain neurotransmitter release in exercising rats. *Pharmacology, Biochemistry, and Behavior, 140*, 82–9.

هل يرتبط استهلاك القهوة بوزن الجسم بين طلاب الجامعات؟

الملخص

هدفت هذه الدراسة إلى دراسة العلاقة بين عادات شرب القهوة ووزن الجسم لدى طلاب جامعة جرش الخاصة، وذلك من خلال تقييم مؤشر كتلة الجسم (BMI) ومحيط الخصر لديهم. تحتوي القهوة، المُستهلكة على نطاق واسع عالميًا، على الكافيين ومكونات حيوية أخرى قد تؤثر على النشاط الأيضي، وربما تزيد من الوزن. ولاستكشاف ذلك، ملأ 150 طالبًا من كلية الزراعة استبيانًا ذاتيًا حول الحالة الاجتماعية والديموغرافية واستهلاك القهوة. أُجريت قياسات أنثروبومترية لتصنيف المشاركين إلى فئات: نقص الوزن، والوزن الطبيعي، وزيادة الوزن، والسمنة، وفقًا لإرشادات منظمة الصحة العالمية.

كان متوسط أعمار المشاركين 26.7 عامًا، وبلغ متوسط مؤشر كتلة الجسم 26.29 كجم/م²، مما يعكس انتشارًا للسمنة بنسبة 58% ضمن العينة. ولم يُظهر التحليل أي فروق جوهرية في استهلاك القهوة أو توقيت تناولها بين فئات مؤشر كتلة الجسم ومحيط الخصر، مما يشير إلى أن تناول القهوة لا يؤثر بشكل

مباشر على وزن الجسم في هذه الفئة. كما أشار تحليل التباين إلى وجود علاقة ضعيفة بين استهلاك القهوة وكلٍّ من مؤشر كتلة الجسم ومحيط الخصر، مدعومًا بانخفاض قيم معامل بيتا.

تشير هذه النتائج إلى أن استهلاك القهوة بين طلاب الجامعات قد يكون له تأثير ضئيل على وزن الجسم على الرغم من انتشاره. وقد تلعب عوامل مثل إضافة السكر إلى القهوة أو انخفاض مستويات النشاط البدني دورًا أكثر أهمية في حالة الوزن. ونظرًا لارتفاع معدل السمنة الملحوظ، من الضروري إجراء المزيد من البحوث لتحديد عوامل أخرى تتعلق بنمط الحياة والنظام الغذائي تؤثر على الوزن، ولتوجيه استراتيجيات فعالة لإدارة السمنة. وهذا يُبرز الحاجة إلى برامج تعزيز الصحة المُستهدفة التي تُركز على النشاط البدني والوقاية من السمنة بين الطلاب.

الكلمات المفتاحية: القهوة، وزن الجسم، مؤشر كتلة الجسم، محيط الخصر، السمنة.