P-ISSN: 1992-0091
E-ISSN: 2708-3454

Modern Sport
Vol.23 No.4 ,2024

Published 30/12/2024 Open Access

DOI: https://doi.org/10.54702/b3q88w77

Impact of Chia Seed Ingestion and Physical Activity on Insulin Resistance and Triglyceride Levels in Men and Women

Ali Abdulraheem Jabbar [1], Maysaa Jalal Majeed [2], Muataz Fawzi Hussein[3]

1,2&3 University of Baghdad, college of Medicine – Iraq

Received: 17/10/2024, Revised: 10/11/2024, Accepted: 14/11/2024, Published: 30/12/2024

Abstract

The Chia seeds are a herbaceous plant native to southern Mexico and Guatemala. They have many nutritional and medicinal uses because they contain fibers, minerals and vitamins. These components have a significant impact on insulin resistance, which is considered a source of risk for many diseases, most notably type 2 diabetes. High levels of triglycerides. It is considered a source of danger for many diseases, the most important of which is heart disease. This study aims to evaluate the effect of consuming chia seeds on parameters of insulin resistance and triglyceride levels in individuals who suffer from insulin resistance. The study also examines whether there is a difference in the responses of women and men. as well as does the effect of chia seeds differ according to activity? The study included 100 people, 60 men with insulin resistance, 20 of whom walk for at least half an hour daily, and 40 women, 15 of whom walk for at least half an hour daily. They were all directed to take chia seeds for 45 days at a rate of one tablespoon after soaking them in water for a period of no less than an hour. The study showed a clear decrease in the level of insulin resistance in all men, as it decreased by 38.37%, and at a higher rate in men who were active by 41.47%, while the percentage decreased in women to a lesser extent than men, but also showed a decrease by 16.82%, and at a higher rate in women who practice walking by 19.35%. in conclusion The results of this study demonstrate a significant reduction in insulin resistance among both men and women, with a more pronounced effect in individuals who engage in physical activity. and this achieves one of the sustainable development goals of the United Nations in Iraq which is (Good Health).

Keywords | **chia seeds, insulin resistance, triglyceride, Physical exercise.**

Introduction:

The herbaceous plant known as chia (Salvia hispanica L.) belongs to the Lamiaceae family. this plant species. was a significant crop in pre-Columbian Mesoamerica and is native to northern Guatemala and southern Mexico. chia seeds were prized for their use in medicines in addition to their use as food [1]. It has unique botanical characteristics. Chia seed has an impressive nutritional makeup, with 486 kcal/100 g consisting of 16% protein, 30% total lipids, 42% carbohydrates, and 34% dietary fiber. Furthermore, polyphenols, carotenoids, vitamins, minerals, flavonoids, anthocyanins, and polyunsaturated fatty acids are only a few of the important micronutrients that are abundant in chia [2], The use of chia seeds has expanded in current years due to their nutritional, physicochemical and sensory benefits. chia seeds it enhances your breads and cakes with proteins, unsaturated fatty acids, antioxidants and dietary fiber. chia seeds resurged.

How to Cite: Ali Abdulraheem Jabbar, Maysaa Jalal Majeed, & Muataz Fawzi Hussein. (2024). Impact of Chia Seed Ingestion and Physical Activity on Insulin Resistance and Triglyceride Levels in Men and Women. Modern Sport, 23(4), 148-156. https://doi.org/10.54702/b3q88w77

P-ISSN: 1992-0091
E-ISSN: 2708-3454
Modern Sport
Vol.23 No.4 ,2024
Published 30/12/2024 Open Access

Insulin resistance is defined as the weakened target tissues' physiologic response to insulin stimulation. Although insulin resistance can develop in any tissue that has insulin receptors, the liver, skeletal muscle, and adipose tissue are the main culprits. Insulin resistance reduces the body's ability to process glucose, which causes a compensatory rise in the synthesis of beta cell.

Insulin plays a critical role in fat metabolism by promoting the storage of excess fats as triglycerides in adipose tissue, while simultaneously inhibiting lipolysis, or fat breakdown, to ensure a steady supply of fatty acids during fasting periods [3]. However, in insulin-resistant states, glucose intolerance and hyperinsulinemia develop as compensatory mechanisms, significantly increasing the risk of diseases such as Insulin resistance [4].

Aims of the study to evaluate the effect of consuming chia seeds on parameters of insulin resistance and triglyceride levels in individuals who suffer from insulin resistance.

Method and procedures:

2.1 Study individual

The research was carried out in the biochemistry department, College of Medicine / University of Baghdad and the National Center for teaching laboratories in Medical City of Baghdad / Iraq, it was used a randomized sampling technique to ensure that each individual in the population had an equal chance of selection, which minimizes selection bias and improves the generalizability of our results. Participants were recruited through mutual consent, where each individual was informed about the study's purpose and procedures and provided written consent to participate. This approach not only aligns with ethical standards but also supports the validity of our sampling method by ensuring voluntary participation from a representative group consisted of 100 peoples (60 males,40 female). chia seed we sourced from a local supermarket. brand name (Mersin), country of origin (Turkia), all of which were verified to ensure the authenticity and quality of the seeds, ingestion of chia seeds daily for 45 days, with a single measurement for all participants (one tablespoon per day in fasting). The serum glucose, insulin and triglyceride level were measured before and after consumption the seeds while fasting for (8-12 hours) before drawing a blood sample from them, while under physical exercise individual is one who walks for at least half an hour daily and how practice daily walking for a period of not less than six months where takin in to consideration.

2.2 Determination of serum Glucose mg/dl concentration

fully Automated analysis, Hexokinase/G-6-PDH method from ARCHITECT c Systems from Abbott compony**.**

2.2 Determination of serum insulin µU/ml concentration

fully Automated analysis, Immune Enzymometric Assay AIA2000ST model from Tosoh compony.

2.3 Determination of HOMA-IR index

This indicator of insulin resistance measured mathematically through an equation based on the units in which glucose is measured**:**

HOMA-IR = (glucose (mg/dl) X insulin (µU/ml) / 405 [5].

2.4 Determination of serum triglycerides mg/dl concentration

fully Automated analysis, Glycerol Phosphate Oxidase method from ARCHITECT c Systems from Abbott compony

2.5 Statistical analysis

Mean± SD and P value, result Consider significant at the value when the P value was less than or equal to 0.05, SPSS version 25 program was used in Student's t-test and Pearson Correlation statistical analysis [6].

Results

P-ISSN: 1992-0091
E-ISSN: 2708-3454

Modern Sport
Vol.23 No.4 ,2024

Published 30/12/2024 Open Access

The 100 participants {60 male(20 with practice daily walking) and 40 female(15 with practice daily walking)} in this study their planned age (35-65 years) and body mass index 28 kg/㎡ or higher with clinically and laboratory-diagnosed insulin resistance according to WHO criteria did not have any diseases, such as type 2 diabetes and familial hyperlipidemia They were confirmed to have insulin resistance by measuring the Homeostasis Model Assessment of Insulin Resistance (HOMA-IR).

Table 1 shows the parameters under study in men before and after ingestion of chia seeds for 45 days at a rate of one tablespoon per day. Show Significant (P< 0.05) reduction of serum glucose(96.77 ± 12.08), insulin (13.20 ± 7.23), HOMA-IR(3.18 ± 1.88).While non-significant (P 0.21) for TG(145.06 ± 66.23).

Table .1 Mean ± SD of age, BMI, Serum glucose Insulin and Triglyceride in Men with insulin resistance before and after chia seed ingestion and effect of chia seed ingestion with exercise.

variables	Men before ingestion chia seeds Mean± SD (n.40)	Men after ingestion chia seeds Mean± SD	Men how practice daily walking after ingestion chia seeds Mean± SD (n.20)	P-value
Age (years)	41.05 ± 6.72	-		descriptive
BMI (Kg/ m^2)	32.26 ± 4.50	-		descriptive
S.Glucose mg\dl	104.42 ± 10.63	96.77 ± 12.08	92.50± 11.12	0.02 s
S.Insulin µU\ml	19.97 ± 13.65	13.20 ± 7.23	12.50 ±4.55	0.00 s
HOMA-IR	5.16 ± 3.69	3.18 ± 1.88	3.02± 1.25	0.00 s
S.TG mg\dl	165.50 ± 70.47	145.06 ± 66.23	140.10± 35.12	0.18 n.s

The percentage change in the HOMA-IR after ingestion of chia seeds for 45 days is 38.37% and 41.47 after chia seed ingestion with exercise, Physical exercise enhances insulin sensitivity through several pathways. During exercise, muscle contractions stimulate glucose uptake independently of insulin, increasing glucose transporter (GLUT-4) activity, especially in skeletal muscles. Post-exercise, insulin sensitivity remains elevated due to increased mitochondrial density, improved blood flow, and changes in muscle composition. This effect helps lower blood glucose levels and reduce insulin resistance over time.

Table 2 shows the parameters under study in women before and after ingestion of chia seeds for 45 days at a rate of one tablespoon per day. Show Significant (P< 0.05) reduction of serum insulin (14.78 ± 0.23), HOMA-IR(3.61 ± 0.88) and serum TG(127.93 ± 16.70) while serum glucose(95.79 ± 7.48) non-significant reduction but its closes to it (p 0.06).

Table .2 Mean ± SD of age, BMI, Serum glucose Insulin and Triglyceride in women with insulin resistance before and after chia seed ingestion and effect of chia seed ingestion with exercise.

variables	Women before ingestion chia seeds Mean± SD (n.25)	women after ingestion chia seeds Mean± SD	women how practice daily walking after ingestion chia seeds Mean± SD (n.15)	P-value
Age (years)	36.33 ± 8.10	-		descriptive
BMI	32.07 ± 2.11	-		descriptive
S.Glucose mg/dl	99.16 ± 5.03	95.79 ± 7.48	94.55±10.02	0.06 n.s
S.insulin µU\ml	17.97 ± 2.65	14.78 ± 0.23	13.70±0.20	0.00 s
HOMA-IR	4.34 ± 0.69	3.61 ± 0.88	3.50± 0.60	0.00 s

P-ISSN: 1992-0091
E-ISSN: 2708-3454
Modern Sport
Vol.23 No.4 ,2024
Published 30/12/2024 Open Access

S.TG mg/dl	158.86 ± 21.49	127.93 ± 16.70	125.22±16.32	0.00 s

The percentage change in the HOMA-IR after ingestion of chia seeds for 45 days is 16.82% and 19.35% after chia seed ingestion with exercise.

3.2 Person's Correlation Analysis

HOMA-IR shows a positive significant correlation with serum insulin and nonsignificant with each of serum glucose, and Triglyceride in men table3 and figure1.

Table .3 Pearson Correlation Results between HOMA-IR and Serum glucose, insulin and TG in men with insulin resistance**.**

variables	HOMA-IR	
	r	p-value
S.Glucose mg\dl	0.196	0.259 N.S
S.Insulin µU\ml	0.972	0.000 S
S.TG mg\dl	0.196	0.259 N.S

S: significant p ≤ 0.05, N.S: non-significant p >0.05

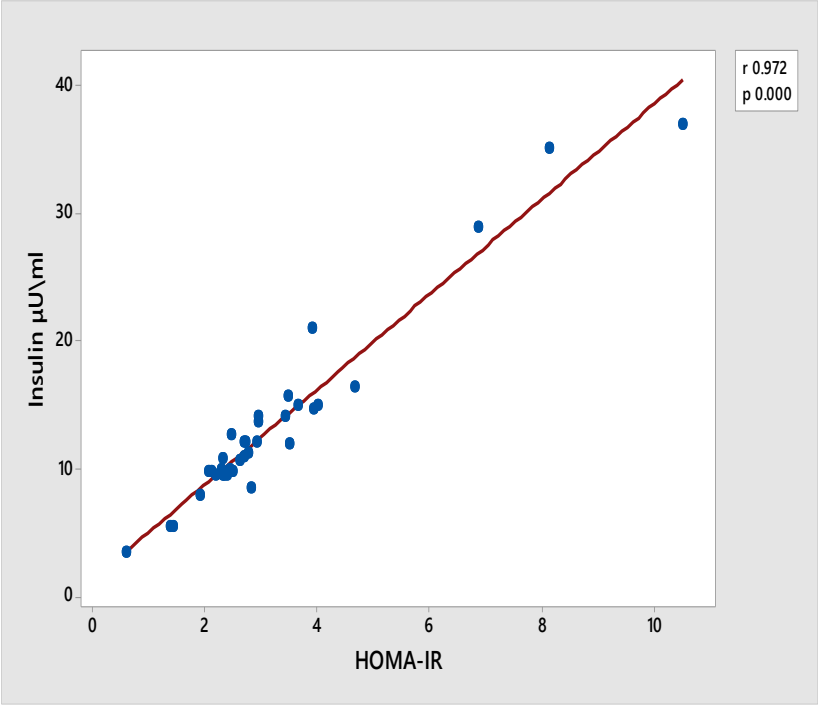

Figure1: Pearson Correlation(r) between HOMA-IR and insulin

HOMA-IR shows a positive significant correlation with serum glucose, insulin and nonsignificant with serum Triglyceride in women show table4 and figures 2,3.

Table .4 Pearson Correlation Results between HOMA-IR and Serum glucose, insulin and TG in women with insulin resistance.

variables	HOMA-IR	
	r	p-value
S.Glucose mg\dl	0.37	0.00 S

P-ISSN: 1992-0091
E-ISSN: 2708-3454

Modern Sport
Vol.23 No.4 ,2024

Published 30/12/2024 Open Access

S.Insulin µU\ml	0.97	0.00 S
S.TG mg\dl	0.12	0.38 N.S

S: significant $p \leq 0.05$, N.S: non-significant $p > 0.05$

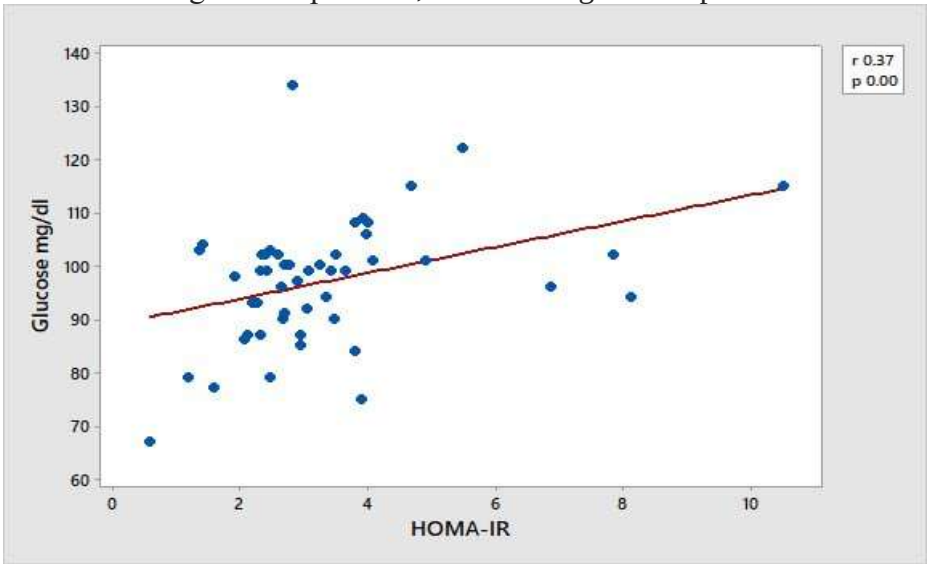

Figure 2: Pearson Correlation(r) between HOMA-IR and Glucose.

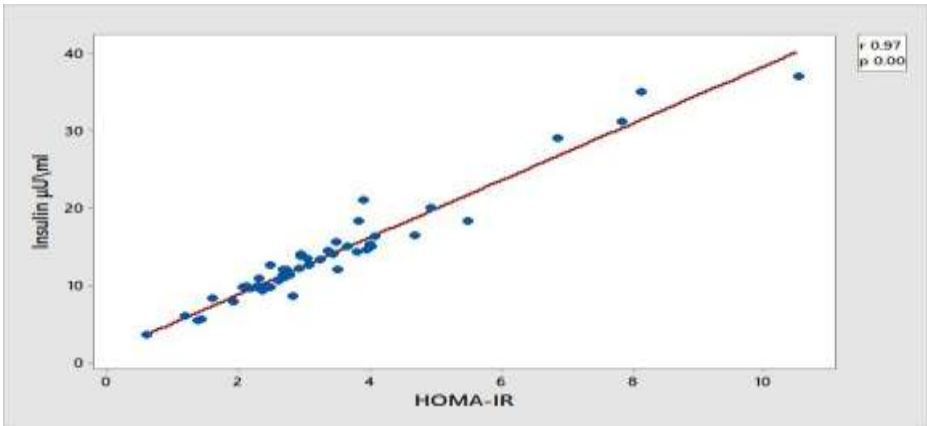

Figure 3: Pearson Correlation(r) between HOMA-IR and Insulin.

Discussion

Insulin resistance indicator (HOMA-IR), change in men in the percentage of 38.37% after ingestion of chia seed and 41.47% after chia seed ingestion with exercise while in women 16.82% and 19.35% after chia seed ingestion with exercise. The explanation for this change is attributed to: chia seeds directly effect on glucose metabolism and insulin (which directly affects insulin resistance parameters) because they are rich in minerals, fatty acids, and fiber. They contain α-Linolenic Acid, which is an omega-3 fatty acid and constitutes 50.6% of the total fatty acids in chia seeds. which help improve insulin sensitivity, leading to better glucose control. The possible effect of chia seeds as suggested by many studies could be attributed to these vitamins (such as D, B_3) and minerals (such as ca^{+2}, po4, Mg, se, copper, zinc and iron) The 18.2% linoleic acid component of chia seeds plays a role in glucose metabolism and stabilizing its level in the blood by enhancing insulin action. Arginine, a non-

P-ISSN: 1992-0091
E-ISSN: 2708-3454
Modern Sport
Vol.23 No.4 ,2024
Published 30/12/2024
Open Access

essential amino acid, indirectly affects glucose metabolism by increasing the production of nitric oxide, which has an essential effect on glucose and lipid metabolism [1,2,7].

There is no single mechanism that explains the effect of chia seeds on insulin resistance, but the whole proposal was based on the effect of vitamins and minerals found in chia seeds and their effect on insulin resistance. the minerals that affect glucose levels in chia seeds are calcium, which is found in very high proportions of up to 749.42 mg per 100 g. Calcium plays a role in improving the cells' response to insulin. It contains magnesium at a concentration of 164.34 mg per 100 grams, which is a very essential mineral in improving insulin sensitivity, as magnesium deficiency leads to poor glucose control and the emergence of insulin resistance. Zinc, which has a concentration of 3.16 mg per 100 g, is important for insulin functions and affects glucose storage in the body, along with iron, which is found at a rate of 5.81 mg per 100 g. Iron plays an essential role in transporting oxygen in the blood and thus metabolic processes related to glucose. Chia seeds contain small proportions of copper and selenium 1.83 and 0.20 mg per 100 g, respectively. These minerals support cellular functions and help protect against oxidative stress, which may play a role in the body's response to insulin [10]. chia seeds that indirectly effect of triglycerides through affecting of glucose and insulin, and thus insulin resistance.TG reduction change in the percentage of 12.35% after ingestion of chia seed and 15.34% after chia seed ingestion with exercise in men while in women 19.47% after ingestion of chia seed and 21.18% after chia seed ingestion with exercise the explanation for this change attributed to the effect may be direct through vitamins and minerals that affect fat metabolism, such as vitamin B_3 (niacin), which is used to treat dyslipidemia, where medicinal doses of niacin are used that may reach 3000 mg. [8], omega-3(ω-3) and omega-6(ω-6) [9]. However, there is a study that does not agree with the aforementioned results which suggest [10]. It has been noted that there is a difference in the response of women and men when given chia seeds. We see that the male response is 38.46% while the female response is 16.87% The likely reason for this may be due to a difference in hormones, and this is what I suggest. Chia seed therapy significantly increased serum testosterone levels along with 17- and 3β-HSD activity. Similarly, quercetin, morin, rutin, and omega-3 fatty acids are found to augment testosterone levels, backed by prior animal research [11]. Hormonal Balance. Zinc, a crucial mineral found in chia seeds, plays a role in maintaining healthy testosterone levels in men [12]. chia seeds are also rich in vitamin E and other antioxidants that are known to boost sperm motility and quantity [13]. testosterone was linked to less body fat, better insulin sensitivity, and lower glucose levels in men, it was linked to adiposity, insulin resistance, and higher glucose concentrations [14]. by author words, which produced by researchers say a new study indicates that testosterone replacement therapy helped men with type 2 diabetes. They said testosterone treatment can be beneficial for managing type 2 diabetes because the therapy can improve blood sugar as well as cholesterol levels [15]. We notice that the percentage of change in HOMA-IR in men (38.37%) is higher than the percentage of change in women (16.87%). This may be explained by the fact that the age of menopause may be the reason. Although there were no significant changes between women before and after menopause, this may be due to a statistical reason, as the number of women included in the study is not eligible for statistical judgment according to the sample size equation. However, despite this, we notice a decrease in the level of HOMA-IR, and also in addition to the effect of minerals and vitamins found in chia seeds, this may be explained or attributed to the estrogen hormone, which can be explained as follows: Chia seeds are high in fiber and contain lignans to support healthy estrogen. add them to smoothies, sprinkle them on a salad, or make chia seed

P-ISSN: 1992-0091
E-ISSN: 2708-3454
Modern Sport
Vol.23 No.4 ,2024
Published 30/12/2024
Open Access

pudding [16]. The idea behind seed cycling is that certain types of seeds, such as pumpkin, flax, and chia, can help regulate the levels of estrogen, progesterone and others [17]. Hormone imbalances can wreak havoc on a woman's body. So many conditions, ranging from PCOS to PMS, are rooted in blood glucose dysregulation. a 2019 study has found that one simple diet hack can help: adding a serving of Chia Seed Pudding to your daily routine. Chia Seed Pudding can help improve blood glucose, cholesterol, blood pressure, and even immunity. Who knew that such small seeds could pack such a punch chia Seeds are high in fiber, specifically soluble fiber. this type of fiber binds to the glucose molecules in our food, slowing down their absorption and preventing spikes in blood glucose. Additionally, Chia Seeds contain alpha-linolenic acid, an omega-3 fatty acid that has been shown to improve insulin sensitivity. insulin sensitivity is crucial for healthy blood glucose levels, and it is often compromised in those with hormone imbalances. But it's not just the soluble fiber and omega-3s in chia seeds that make them beneficial for balancing blood glucose. Chia Seeds also contain antioxidants that help protect cells from oxidative stress (hello inflammation). This can then contribute to insulin resistance and blood glucose dysregulation. By reducing oxidative stress, we can help support healthy blood glucose levels. some studies have also indicated that estrogen suppresses glucose production in the liver and that impairing the estrogen receptor [18]. The quintessential female sex hormone estrogen stimulates cells that line blood vessels to deliver insulin to muscles, lowering blood glucose [19]. another possible suggestion: Estrogen receptors ERα and ERβ have been demonstrated to affect energy balance, fat and glucose metabolism in hypothalamic neurons, liver, adipose tissue, muscle and the endocrine pancreas. other membrane estrogen receptors are involved in the regulation of the pancreatic β-cell function and hypothalamic neurons.

Incorporating chia seeds into the diet can positively impact various physiological parameters in males and females after physical activity. Physical exercise enhances insulin sensitivity through several pathways.

During exercise, muscle contractions stimulate glucose uptake independently of insulin, increasing glucose transporter (GLUT-4) activity, especially in skeletal muscles. Post-exercise, insulin sensitivity remains elevated due to increased mitochondrial density, improved blood flow, and changes in muscle composition. This effect helps lower blood glucose levels and reduce insulin resistance over time. Chia seeds are rich in antioxidants, fiber, and omega-3 fatty acids, which contribute to reducing oxidative stress and improving insulin sensitivity, as previously mentioned. Females may experience greater antioxidant effects due to the role of estrogen in reducing inflammation and promoting fat metabolism. In contrast, males may notice more significant improvements in physical performance and muscle recovery due to their fatty acid content, which aids in muscle repair after exercise [20].

Conclusions:

From the results, chia seeds can be considered an effective factor in reducing insulin resistance and triglyceride in both sexes who have insulin resistance, although men's response to chia seeds was greater than women's response in correcting insulin resistance. It is clear that the effect of chia seeds on people who practice daily walking was a great effect. the effect of chia seeds on insulin resistance is greater with walking. Therefore, it is recommended to practice walking while ingestion of seeds for those who suffer from insulin resistance.

Author's declaration:

Conflicts of interest: None

We confirm that all tables and figures in this article are ours and written by the researchers themselves.

P-ISSN: 1992-0091
E-ISSN: 2708-3454
Modern Sport
Vol.23 No.4 ,2024
Published 30/12/2024
Open Access

Ethical-Clearance: this manuscript approved by local ethical committee of physical education and sport sciences college for women on (November /2024)

Author's contributions:

All contributions of this study were done by the researchers (A.A., M.J. and M. F.) who get the main idea and work on writing and concluding also with number of experts, the researchers themselves in Statistics, Ureska Dobersek in revision, Aida AL-awamleh in proofreading

Facilitate the task: this study was supported by the biochemistry department, College of Medicine / University of Baghdad and the National Center for teaching laboratories in Medical City of Baghdad / Iraq.

References:

[1] E. K. Rahal, M. Meryama, and Z. Rachid, "Chia (Salvia Hispanica): An Overview of Its Botany, Uses, Reproductive, Biology, Pharmacological Properties and Industrial Potentials," *Austin J. Pharmacol. Ther.*, vol. 11, no. 2, pp. 2–5, 2023, doi: 10.26420/austinjpharmacolther.2023.1172.

[2] S. Review, "Role of Chia Seed (," pp. 9–18, 2024, doi: 10.4103/bjem.bjem.

[3] A. C. Carpentier, "100th anniversary of the discovery of insulin perspective: insulin and adipose tissue fatty acid metabolism," *Am. J. Physiol. Metab.*, vol. 320, no. 4, pp. E653–E670, Feb. 2021, doi: 10.1152/ajpendo.00620.2020.

[4] Z. A. E. Abbas and H. D. El-Yassin, "The impact of glycemic control on procalcitonin level in patients with type ii diabetes," *Med. J. Babylon*, vol. 19, no. 3, pp. 391–395, 2022, doi: 10.4103/MJBL.MJBL_50_22.

[5] M. A. Arif, M. K. Rasheed, and A. A. Ismaeel, "Study some biochemical parameters in patients with Coronary artery disease with and without Type 2 diabetes," *J. Fac. Med. Baghdad*, vol. 66, no. 1, pp. 51–57, 2024, doi: 10.32007/jfacmedbagdad.6612173.

[6] H. I. Okagbue, P. E. Oguntunde, E. C. M. Obasi, and E. M. Akhmetshin, "Trends and usage pattern of SPSS and Minitab Software in Scientific research," *J. Phys. Conf. Ser.*, vol. 1734, no. 1, pp. 0–7, 2021, doi: 10.1088/1742-6596/1734/1/012017.

[7] N. H. Sebo, "Chia seeds nutritional value and its effect on serum glucose and cholesterol concentration in rats," *Polytech. J.*, vol. 7, no. 1, 2017, doi: 10.59341/2707-7799.1751.

[8] E. Wuerch, G. R. Urgoiti, and V. W. Yong, "The Promise of Niacin in Neurology," *Neurotherapeutics*, vol. 20, no. 4, pp. 1037–1054, 2023, doi: 10.1007/s13311-023-01376-2.

[9] W. Khalid *et al.*, "Chia seeds (Salvia hispanica L.): A therapeutic weapon in metabolic disorders," *Food Sci. Nutr.*, vol. 11, no. 1, pp. 3–16, 2023.

[10] P. Pam, I. El Sayed, S. Asemani, P. Jamilian, M. Zarezadeh, and Z. Ghoreishy, "The effectiveness of chia seed in improving glycemic status: a systematic review and meta-analysis," *Diabetes Metab. Syndr. Clin. Res. Rev.*, p. 103065, 2024.

[11] S. O. Abarikwu, C. A. Otuechere, M. Ekor, K. Monwuba, and D. Osobu, "Rutin ameliorates cyclophosphamide-induced reproductive toxicity in male rats," *Toxicol. Int.*, vol. 19, no. 2, pp. 207–214, 2012, doi: 10.4103/0971-6580.97224.

[12] L. Te, J. Liu, J. Ma, and S. Wang, "Correlation between serum zinc and testosterone: A systematic review," *J. Trace Elem. Med. Biol.*, vol. 76, p. 127124, 2023.

[13] S. Motyka, E. Skała, H. Ekiert, and A. Szopa, "Health-promoting approaches of the use of chia seeds," *J. Funct. Foods*, vol. 103, p. 105480, 2023.

[14] S. Z. Lutz *et al.*, "Sex-specific associations of testosterone with metabolic traits," *Front. Endocrinol. (Lausanne).*, vol. 10, no. MAR, pp. 1–5, 2019, doi: 10.3389/fendo.2019.00090.

[15] K. Kumari *et al.*, "Treatment with Testosterone Therapy in Type 2 Diabetic Hypogonadal Adult Males: A Systematic Review and Meta-Analysis," *Clin. Pract.*, vol. 13, no. 2,

P-ISSN: 1992-0091
E-ISSN: 2708-3454

Modern Sport
Vol.23 No.4 ,2024

Published 30/12/2024 Open Access

pp. 454–469, 2023, doi: 10.3390/clinpract13020041.
[16] T. La Forge, *Feed Your Chakras: Recipes to Restore & Balance Your Energy Centers*. Wellfleet Press, 2024.
[17] N. Rasheed *et al.*, "Effectiveness of combined seeds (pumpkin, sunflower, sesame, flaxseed): As adjacent therapy to treat polycystic ovary syndrome in females," *Food Sci. Nutr.*, vol. 11, no. 6, pp. 3385–3393, 2023, doi: 10.1002/fsn3.3328.
[18] H. Yan *et al.*, "Estrogen improves insulin sensitivity and suppresses gluconeogenesis via the transcription factor Foxo1," *Diabetes*, vol. 68, no. 2, pp. 291–304, 2019, doi: 10.2337/db18-0638.
[19] Rishabh, S. Bansal, A. Goel, S. Gupta, D. Malik, and N. Bansal, "Unravelling the Crosstalk between Estrogen Deficiency and Gut-biota Dysbiosis in the Development of Diabetes Mellitus," *Curr. Diabetes Rev.*, vol. 20, no. 10, pp. 69–79, 2024.
[20] A. Agarwal, Rizwana, A. D. Tripathi, T. Kumar, K. P. Sharma, and S. K. S. Patel, "Nutritional and Functional New Perspectives and Potential Health Benefits of Quinoa and Chia Seeds," Antioxidants, vol. 12, no. 7, p. 1413, 2023.

تأثير تناول بذور الشيا والنشاط البدني على مقاومة الأنسولين ومستويات الدهون الثلاثية لدى الرجال والنساء.

علي عبدالرحيم جبار1, ميساء جلال مجيد2, معتز فوزي حسين3
1&2&3 جامعة بغداد – كلية الطب

مستخلص البحث

بذور الشيا هي نبات عشبي موطنه جنوب المكسيك وغواتيمالا. ولها العديد من الاستخدامات الغذائية والطبية لاحتوائها على الألياف والمعادن والفيتامينات. ولهذه المكونات تأثير كبير على مقاومة الأنسولين، والتي تعتبر مصدر خطر للإصابة بالعديد من الأمراض، أبرزها مرض السكري من النوع الثاني. مستويات عالية من الدهون الثلاثية. ويعتبر مصدر خطر للعديد من الأمراض أهمها أمراض القلب. تهدف هذه الدراسة إلى تقييم تأثير استهلاك بذور الشيا على مؤشرات مقاومة الأنسولين ومستويات الدهون الثلاثية لدى الأفراد الذين يعانون من مقاومة الأنسولين. وتبحث الدراسة أيضًا فيما إذا كان هناك اختلاف في استجابات النساء والرجال. وكذلك هل يختلف تأثير بذور الشيا حسب النشاط؟ وشملت الدراسة 100 شخص، 60 رجلاً يعانون من مقاومة الأنسولين، 20 منهم يمشون لمدة نصف ساعة على الأقل يوميًا، و40 امرأة، 15 منهم يمشون لمدة نصف ساعة على الأقل يوميًا. وتم توجيههم جميعا بتناول بذور الشيا لمدة 45 يوما بمعدل ملعقة كبيرة بعد نقعها في الماء لمدة لا تقل عن ساعة. وأظهرت الدراسة انخفاضا واضحا في مستوى مقاومة الأنسولين لدى جميع الرجال، حيث انخفض بنسبة 38.37%، وبنسبة أعلى لدى الرجال الذين كانوا نشيطين بنسبة 41.47%، بينما انخفضت النسبة لدى النساء بدرجة أقل من الرجال، ولكنها أظهرت أيضاً انخفاضاً بنسبة 16.82%، وبنسبة أعلى لدى النساء اللاتي يمارسن المشي بنسبة 19.35%. في الختام أظهرت نتائج هذه الدراسة انخفاضا كبيرا في مقاومة الأنسولين بين الرجال والنساء، مع تأثير أكثر وضوحا في الأفراد الذين يمارسون النشاط البدني. وهذا ما يحقق احد اهداف التنمية المستدامة للامم المتحدة في العراق (الصحة الجيدة).

الكلمات المفتاحية | **بذور الشيا,مقاومة الانسولين, الدهون الثلاثية, النشاط البدني**