Tikrit Journal of Pure Science Vol. 29 (6) 2024

TJPS

https://doi.org/10.25130/tjps.v29i6.1675

IASJ

المجلات الاكاديمية العراقية

Tikrit Journal of Pure Science

ISSN: 1813 – 1662 (Print) --- E-ISSN: 2415 – 1726 (Online)

Journal Homepage: https://tjpsj.org/

From Calories to Nutrients: The Role of Lifestyle Changes for Addressing Obesity

Nour Shakir Rezaieg

Anbar Directorate of Education, Al-Anbar, Iraq

ARTICLE INFO.

Article history:

-Received: 7 / 7 / 2024

-Received in revised form: 20 / 8 / 2024

-Accepted: 25 / 8 / 2024

-Final Proofreading: 4 / 9 / 2024

-Available online: 25 / 12 / 2024

Keywords: Obesity, Diet, Physical activity, Health

Corresponding Author:

Name: Nour Shakir Rezaieg

E-mail: nourshakir123@gmail.com

Tel: + 964 7852202376

ABSTRACT

Background: Obesity is still a main health problem in many countries. Obesity-related behaviors, such as low physical activity and unhealthy eating habits, tend to causes many problems, which highlights the need for early prevention from it. **Objective:** To explore the Interplay between obesity and healthy diet and exercise programs. As well to evaluate effect of 1 months of follow healthy life style on the status of GH and some biochemical parameters in obese subjects. **Materials and methods:** In this study, 40 individuals (20 obese and 20 non-obese male) from AL-Ramadi city during the period from April to May. Their age was 25-27 years old. Serum was taken to measure GH, and certain biochemical parameters and hormone, before and after applicate healthy diet and exercise program. **Results:** Serum the level of Insulin, FBG, HOMA-IR, TC, TG, LDL, BMI, weight and Fat showed significantly decrease, while there was significantly increase in GH, Vit D, HDL and protein, muscles after month from applicate the healthy diet and exercise program. **Conclusion:** In obesity, GH productions are reduced which are reversible with losing of weight, This is what was achieved through our results, therefore, growth hormone deficiency is considered a result of obesity and not a cause of it.

Tikrit Journal of Pure Science Vol. 29 (6) 2024
https://doi.org/10.25130/tjps.v29i6.1675
TJPS

من السعرات الحرارية إلى العناصر الغذائية: دور تغييرات نمط الحياة في معالجة السمنة

نور شاكر رزيج

مديرية تربية الأنبار، الأنبار، العراق

الملخص

الخلفية: لا تزال السمنة مشكلة صحية رئيسية في العديد من البلدان. تميل السلوكيات المرتبطة بالسمنة، مثل قلة النشاط البدني وعادات الأكل غير الصحية، إلى التسبب في العديد من المشاكل، مما يسلط الضوء على الحاجة إلى الوقاية المبكرة منها. الهدف: استكشاف التفاعل بين السمنة وبرامج النظام الغذائي الصحي وممارسة التمارين الرياضية. وكذلك تقييم تأثير اتباع نمط حياة صحي لمدة شهر واحد على حالة هرمون النمو وبعض المعايير الكيميائية الحيوية لدى الأشخاص المصابين بالسمنة. المواد والطرق: في هذه الدراسة، أجريت على 40 فردًا (20 من الذكور المصابين بالسمنة و 20 من غير المصابين بالسمنة) من مدينة الرمادي خلال الفترة من أبريل إلى مايو. تراوحت أعمارهم بين 25 و 27 عامًا. تم أخذ مصل لقياس هرمون النمو وبعض المعايير الكيميائية الحيوية والهرمون، قبل وبعد تطبيق برنامج النظام الغذائي الصحي وممارسة التمارين الرياضية. النتائج: أظهرت مستويات الأنسولين، FBG، HOMA-IR، TC، TG، LDL، BMI، الوزن والدهون في مصل الدم انخفاضًا ملحوظًا، بينما كان هناك زيادة ملحوظة في هرمون النمو، وفيتامين د، وHDL والبروتين والعضلات بعد شهر من تطبيق النظام الغذائي الصحي وبرنامج التمارين الرياضية. الاستنتاج: في السمنة، تقل إنتاجات هرمون النمو والتي يمكن عكسها بفقدان الوزن، وهذا ما تم تحقيقه من خلال نتائجنا، وبالتالي، فإن نقص هرمون النمو يعتبر نتيجة للسمنة وليس سببًا لها.

1- Introduction

Eating a healthy diet helps prevent malnutrition in all its forms, as well as no communicable diseases, including diabetes, heart disease, stroke and cancer. Diet is unlike eating, behavior which think considered the routine followed by an individual or the community in eating everyday food and the activity and movement that he tackles. Dietary behavior is influenced by the kind of food, economic situation, climate, social practices and traditions.[1].

Unhealthy foods, many times high in added sugars, saturated fats, and refined carbohydrates, are comfortably accessible and heavily marketed, making them an easily choice for many [2].

These foods activate the reward system in the brain and raise the dopamine, which leads to a feeling of pleasure or convenience. This convenience, coupled with a lack of nutritional awareness, contributes to the overconsumption

https://doi.org/10.25130/tjps.v29i6.1675

of these foods and, subsequently, to the development of obesity [3].

Obesity is a multiplex, multifaceted condition impacted by environmental, genetic and behavioral agents, but diet plays a major role. The consumption of unhealthy foods impacts energy balance, metabolic health, and overall well-being, leading to excess body fat accumulation. This accumulation increases the risk of various health complications, including cardiovascular diseases, type 2 diabetes, and some cancers. Moreover, the social and psychological impacts of obesity, such as stigmatization and decreased quality of life, further underscore the urgency of addressing unhealthy dietary patterns [4].

Over the past million years, through natural selection The human body has developed an endocrine system adapted to an environment with inadequate food source. However, in modern developed societies with easy food access, over nutrition frequently occurs. This shifts the dominant role towards increased insulin and suppressed GH, and thus inhibits lipolysis and increases more energy storage and lipid synthesis, this action results in obesity development. The figure below shows the secretion and functions of human growth hormone.

The Figure below explains that the GH is released from the anterior pituitary gland by being stimulated by two main hormones (peptides) released by the hypothalamus: Growth hormone-releasing hormone (GHRH) stimulates the secretion of GH, while somatostatin, [also known as growth hormone-inhibiting hormone (GHIH)] inhibits the secretion of GH. Once secreted into the circulation, GH takes action on peripheral organs to stimulate secretion of insulin-like growth factor I (IGF-I). IGF-I mediates many actions [5].

This study aims to provide an understanding of how dietary choices influence weight gain and health results. Furthermore, it will discuss the effect of a healthy life style program on the anthropometric and biochemical status of adult obese

Findings of this study are expected to be a primary step toward planning for designing heathy diets with exercise programs to address the growing health hazard and protecting children, adolescents and adults from the health complications of obesity.

https://doi.org/10.25130/tjps.v29i6.1675

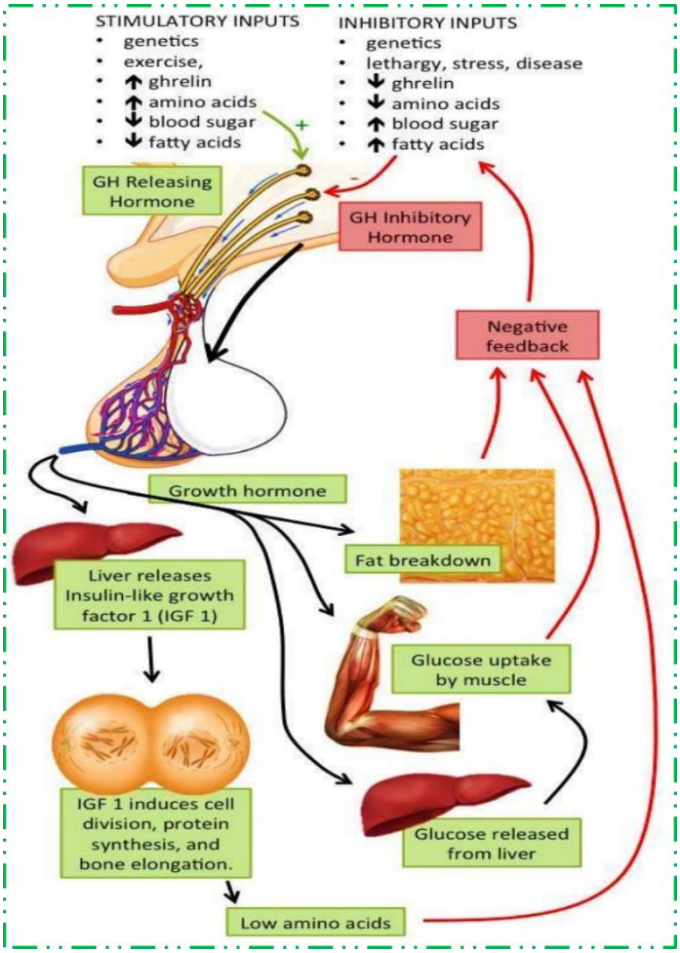

Figure: Growth hormone (GH) Axis. [5].

2- Materials and methods

2.1 Study Design

An analytical cross-sectional study was conducted among Twenty obese subjects aged (25-27 years), excluding those with obesity due to genetic or endocrine causes, and followed for 1 months from April to May 2024. Twenty healthy subjects aged (25-27 years) as a control group .

2.2 Ethical Committee

The study was accepted by the Ethical Committee of the Anbar Health Directorate. Anbar. Iraq

2.3 Data Collection

The cross-sectional study included many personal data related to the individuals participating in the study, and a questionnaire form that was prepared in advance was used for all data, which includes: height, weight, age, diet, and daily lifestyle. Study participants reported their dietary habits and daily lifestyle even for a period 21of days before the start of the study to ensure that their usual daily energy intake did not change.

2.3 Protocol

In accordance with the guidelines set by the World Health Organization (WHO) [6] to follow a healthy diet in order to prevent chronic and communicable diseases and prolong life in better health. Accordingly, our hypothesis was designing a healthy diet with a better adherence to WHO guidelines is related to the ability to

https://doi.org/10.25130/tjps.v29i6.1675

lose weight in a healthy way in addition to regular and recommended exercises to build muscle mass that helps burn fat for obese participants aged (25-27) years.

The researcher aims at a 4 weekly meal plan to make Energy intake calories less than energy expenditure .

•First Week

✓ During the first week, were followed the following healthy dietary practices as a gradually:

✓ Reducing fat consumption

✓ Changing from saturated to unsaturated fats

✓ Reducing industrially produced trans fats (present in processed food, snack food, frozen pizza, fried food, pies, cookies, fast food, margarines and spreads) which are not portion of a healthy food.

✓ Reducing sugars and salt intake

✓ Increasing activity levels gradually by practicing walking daily, starting from 5 minutes until reaching 30 minutes per day, and exposure to sunlight to help raise the level of the hormone dopamine .

✓ Aerobic exercise such as, walking, running, jogging, weight training, or a combination of these.

•Second Week

From the second week until the fourth week, the diet shown in the table (at the last page) was followed (the system was approved by a medical staff).

•Workout plan designed

The goal of this exercise program consists of resistance and aerobic exercises that stimulate great muscle mass, utilize moderate loads, and have relatively suitable rest periods in order to maximize the GH response to exercise. Thus, we can provide a non-pharmacological method to reduce adipose tissue deposits and increase lean muscle mass (Tables in the last page).

2.4 Anthropometric Measures

Measurement of weight (Wt), height (Ht), body mass index (BMI), Protein (Kg), Muscles (Kg) and Fat (Kg) was calculated by InBody Machine (table 1).

Table 1: Distribution of Body Mass Index (BMI) by weight status

List	Weight status	Body Mass Index (BMI)
1	Underweight	Below 18
2	Normal weight	18.5-24.9
3	Overweight	25.0-29.9
4	Obesity (class I)	30.0-34.9
5	Obesity (class II)	35.0-39.9
6	Obesity (class III)	Above 40

2.5 Laboratory Analysis

Five ml of venous blood was drawn from all participants in the study. Blood was also drawn from people suffering from obesity one month before starting the healthy diet and exercise program and one month after starting the regimen. Specimens from the control group were collected once.

After drawing blood using a medical syringe, it was placed in a test tube free of any coagulant and then placed in a centrifuge (3000 rpm, 15 min) for the purpose of obtaining the serum which used to estimate the levels of biochemical tests .

2.5.1 Assessment of GH Concentration

Growth hormone concentration in the serum was estimated in serum by using Enzyme Linked Immunosorbent Assay (ELISA) kit prepared from fortress company from United Kingdom [7].

https://doi.org/10.25130/tjps.v29i6.1675

2.5.2 Assessment of Vit.D2 Concentration

Vit.D concentration in the serum was estimated by utilizing diagnostic kits prepared from Germany Immunodiagnostic systems (ids) company by ELISA technique [8].

2.5.3 Assessment of Insulin Concentration

Insulin hormone concentration in the serum was estimated by utilizing Enzyme Linked Immunosorbent Assay (ELISA) kit according to IBL company from Hamburg, Germany [9].

2.5.4 Assessment of Lipid profile Concentration

Lipid profile in the serum were estimated by using laboratory kits (Bio Systems, Spain) to measure: Total cholesterol (TC), Triacylglycerol (TAG), Low density lipoprotein cholesterol (LDL-C) and High-density lipoprotein cholesterol (HDL-C).[10]

2.5.5 Assessment of FBG and HOMA-IR

Fasting blood glucose (FBG) concentration in serum was estimated by using enzymatic colorimetric method (GOD-POD).

HOMA-IR was utilized as an insulin resistance index and estimated by the following homeostasis model assessment (HOMA-IR) formula.

The constant 405 must be replaced by 22.5 if glucose is expressed in S.I. units.

(HOMA-IR) = [fasting insulin (µU/ml) × fasting glucose

(The constant 405 must be replaced by 22.5 if glucose is expressed in S.I. units) [9].

2.6 Statistical Analysis

Statistical analysis of all data was performed using SPSS version 20. The continuous Variables were presented as (Mean ± SE). The one-way-ANOVA is utilized to evaluates if there are statically significant. A p-value ($P \leq 0.05$) was considered statistically significant. **Results**

The results showed a significant increase ($p<0.05$) in each BMI, weight, fat, muscle, protein, FBG, Insulin, HOMA-IR, TC, TG and HDL of obese group, While, the results showed decrease in each GH, Vit D and LDL in compared to control group.

The results showed a significant decrease ($p<0.05$) in each BMI, weight, fat, FBG, Insulin, HOMA-IR, TC, TG and HDL of obese group, While, the results showed increase in each GH, Vit D, Muscles, Protein and LDL a month after the application of the diet with the exercise system, in compared to results in same group before a month from the application of the diet with the exercise system.

https://doi.org/10.25130/tjps.v29i6.1675

Tables 2: show Mean ±SE of studied parameters of obese group after and before apply the diet and exercise program

Parameters	Mean ± SE			P-value
	Control Group	Obese Group		
		After Month	Before Month	
Age	25.95±0.34	26.05±0.46	25.57±0.46	NS
BMI	24.4±0.48	38.79±0.65	35.45±0.23	0.0001*
High(cm)	172.87±0.21	173.67±0.21	173.67±0.21	NS
Weight(kg)	72.98±0.71	115.05±0.36	108.82±0.87	0.0001*
Muscles(kg)	39.01±0.28	41.11±0.62	43.95±1.09	0.0006*
Fat(kg)	18.15±0.83	25.43±0.41	20.98±0.87	0.0001*
Protein(kg)	14.08±1.06	9.53±0.65	12.03±0.92	0.0003*
Vit D (ng/ml)	33.20±0.03	18.33±0.23	20.43±1.09	0.0009*
FBG (mg/dl)	92.05±1.06	111.0±1.01	97.01±1.23	0.0007*
Insulin (µU/ml)	6.01±0.82	18.48±0.87	15.93±0.25	0.0003*
HOMA-IR	3.25±0.44	4.75±1.09	3.01±0.82	0.0006*
TC (mg/dl)	175.01±0.51	191.1±0.35	169.7±1.01	0.0001*
TG (mg/dl)	133.04±0.57	197.2±0.24	177.01±0.08	0.0007*
HDL-C (mg/dl)	56.11±0.81	33.4±0.43	38.75±1.01	0.0009*
LDL-C (mg/dl)	74.70±0.21	105.1±1.02	92.09±0.16	0.0004*

***Highly Significant difference between means at 0.05 level.**

Discussion

The purpose of the study was to demonstrate that a healthy diet combined with an exercise program promotes weight loss and increases the health of obese individuals.

Obesity is a complex, chronic disease defined by excessive fatty deposits in the body that can harm health. At the present time, a very large percentage of the world's population suffers from obesity, including children and adolescents, which results in many diseases [11].

In obese group there is significant hyperinsulinemia and hyperglycemia as compared to normal control group (Table 2), IR in obese persons leads to a lessened clearance of blood glucose beside an increased in hepatic glucose output, both combining to result in elevated blood glucose this is referred to as the adipoinsulin axis [12].

The results showed decrease in GH levels in obese group before followed diet and exercise program compared to healthy group (Table 2), this reduction in GH in obesity can be illuminated thru three mechanisms: First: a reduction in GH-releasing hormone (GHRH) release from hypothalamus or an rise in somatostatin action from the hypothalamus also [13]. Second: reduced responsiveness of pituitary somatotrophs. Third: a disturbance of the peripheral signs at either the pituitary gland or the hypothalamic level [14].

As the main role of growth hormone is known in regulating physical growth, it exerts other metabolic effects that include: increasing the rate of protein synthesis in all cells of the body, stimulating the breakdown of fat to generate energy, reducing the rate of glucose use throughout the body, and also increasing muscle mass through sarcomere hypertrophy. Increases protein production [15].

The amount of body fat is directly related to the production of growth hormone. People with high levels of body fat (especially abdomen fat) are more likely to have impaired growth hormone

https://doi.org/10.25130/tjps.v29i6.1675

production. This is consistent with the results obtained in the study.

GH (like insulin) is crucial in adapting the using of calories to the quantity of consumed food, stimulating anabolism when caloric supply overrides demand, and catabolism in the reverse state.

Low levels of growth hormone in people suffering from obesity lead to decreased lipolysis, which represents one of the functions of growth hormone. Moreover, insulin resistance and high level of insulin (hyperinsulinemia) noticed in obesity cause insulin encouraged antilipolytic activities, this agreement with our result (table 2).

Our results showed a significant increase in growth hormone levels after applying both healthy diet and exercise program on obese individuals (Table 2).

In pervious study [16] mentioned that GH has been effectively stimulated in obese subjects by together aerobic and resistance workout of the right strength and time span .

In our research, growth hormone was stimulated in obese people through structured exercise with a healthy high-protein diet over a period of 4 weeks (table 2).

GH regulates energy metabolism, decreases entire fat mass and belly fat mass, this is what was obtained from our results, so, increasing pulsatile GH response might be a therapeutic target, it was achieved over our study and this inagreement with study by [17].

Obesity is associated with hyperglycemia because of impairment in glucose uptake in the muscle and liver addition to IR with diminished antilipolytic effect of insulin that increase hepatic cholesterol formation and decreased HDL-C can result in significant rise in TAG, TC, LDL-C, and significant diminution in HDL-C in obese group paralleled to control (Table 2), the results in agreement with Zhang and his colleagues [18].

The current food environment facilitates the spread of unhealthy eating habits and lack of physical activity, thus leading to weight gain and obesity. The diet system of inhabitants has become identified by high-rise energy density, in which foods rich in fiber have been replaced by products rich in fat and sugars, with a high level of processing, all of them ultimately lead to weight gain [19].

Diets with in elevation in saturated fats are related with raised white adipose tissue deposition, metabolic disease and inflammation. In dissimilarity, diets with high monounsaturated fatty acids and polyunsaturated fatty acids have been revealed to have anti-inflammatory properties and promote a lean healthy phenotype [20].

Through diet that was designed, these types of fats were included to maintain a healthy brain as well in addition to losing weight in a healthy way.

After followed diet and exercise programs, our results showed positive change in each of weight, BMI, fat, protein and muscles in obese group when compared the results before followed the diet and exercise program, it is well known that the important effect of these changes is due to caloric restriction, but exercise had a major role in decreasing weight. This is because

https://doi.org/10.25130/tjps.v29i6.1675

the study group was very regular in exercising with the diet system.

Lack of physical activity combined with an unhealthy diet leads to many health and psychological problems, including: the risk of obesity, cardiovascular disease, metabolic syndrome, diabetes, depression, dissatisfaction and low self-esteem. On the other hand, even a small amount of physical activity will help improve people's health, including mental and physical health, reduce stress, and raise the hormone dopamine and make them happy [21].

As showed in our results (table 2) there was significantly increase in GH levels after followed exercise program, this is consistent with older results by Pranoto et al., [22] which indicated that resistance workout retaining high-volume, whole-body training might be potent mechanism for helping increase GH levels, thus decreasing adiposity and stimulating muscle mass in obese persons.

Weight loss with workout is an significant health metric to stimulate changes in body health. Weight loss might be particularly vital to maximize the developments in insulin sensitivity and lipid adaptations when joined the aerobic exercise with resistance exercise, these are the results we reached through our research [23].

Diet and exercise produce favorable changes in lipid profile. It was clearly confirmed that a healthy diet leads to improvement in Anthropometric Measures in the obese group. In addition to an increase in vitamin D3 through the type of foods that were included in the diet that was designed during this study when compared with Vit D3 before following a healthy diet [24].

Conclusion

The basic factors that increase control over food behavior and physical activity are increasing awareness and level of knowledge about the principles of following a healthy lifestyle for a longer disease-free life. Better results were achieved in terms of weight loss, improved lifestyle, and greater activity in a healthy way through a diet designed by the researcher under medical supervision with an exercise program.

Conflict of interests: There wasn't conflicts of interest.

Sources of funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Tikrit Journal of Pure Science Vol. 29 (6) 2024

https://doi.org/10.25130/tjps.v29i6.1675

The healthy diet

Containers										
Oil	Fruits	Vegetables	Legumes	Nuts	Dairy	Whole grains	Red meat	Fish	Poultry	
	Sunday	Monday	Tuesday	Wednesday		Thursday	Friday		Saturday	
Breakfast	-green detox (Kiwi, spinach, lemon, ginger, water) (Put all ingredients in pitcher, about 2min) -2 slice of black toast - 2 boiled mid eggs -1 cup of skimmed milk -cucumber and tomato	-1 slice whole grain bread -4 table spoon yogurt -dried thyme -black grain -chia seeds -2-piece walnut -any type of vegetable -cup of skimmed milk	-beet detox (1 red beet, medium, 1/2 Apple, 1 carrot, 1/2 orange, inch piece fresh ginger, 1cup of water) (Put all ingredients in pitcher, about 2min) -100g cottage cheese -4walnut -1whole wheat bread (small loaf) -carrot -1 cup of skimmed milk		-1/2 avocado -1 slice whole grain bread -2 egg boiled -chia seed -freshly cracked black pepper -1 cup of tea	-1/2 cup of oat -1 cup of skimmed milk -2 walnut -1 banana -1 table spoon honey	-oat smoothie (1/4 cup of oat, 1/2 cup of skimmed milk, 1 table spoon of peanut butter, drops of vanilla liquid, pinch ground cinnamon, 4 strawberry, 1banana, chia seeds, water)		-green detox (Kiwi, spinach, lemon, ginger, water) -40g cheese -lettuce -4 piece of olive -cucumber -carrot -kiwi -2 slice of toast
Snack	-12 strawberry -1 cup of green tea	-1 orange	-10 cashews -1 cup of green tea		-3 dates -1 cup of coffee	-12 strawberry -cup of green tea	beet detox (1 red beet, medium, 1/2 Apple, 1 carrot, 1/2 orange, inch piece fresh ginger, 1cup of water) (Put all ingredients in pitcher, about 2min)		-30g of nuts -cup of green tea	
Lunch	-150g Grilled chicken breast -vegetable salad (lemon, lettuce, celery, spinach, green arugula, chia seed) -1 cup of lentil soup with carrot	-salad -1table spoon lemon juice -1table spoon olive oil -0.5 table spoon black pepper -1 table spoon peas -1/2 table spoon mustard -1-piece garlic -parsley -2 tomato -2 table spoon bulgur -150g beef steak without fat with broth -cup of tea with mint	-150g marinated chicken balls -salad (1lemon, zested and juiced, corn, green peas, tomato, lettuce, cabbage,1/2 red onion) -1cup of active yogurt (low fat)		-vegetable salad -1boiled potato -6 table spoon of brown rice -vegetable soup (diced tomato, parsley, lemon juice, kidney beans, onion, cauliflower, salt& pepper, garlic, carrot, olive oil, bay leaf) -1/2cup of yogurt	-meat soup (100g beef without fat, Onion chopped, garlic, table spoon olive oil, bouillon cube, water, red cabbage, sweet chili sauce, carrot, fresh cilantro, salt and cracked pepper) -2/3cup of brown rice -salad - tea with mint	-150g Grilled chicken breast -2 brown toast - cup of vegetable soup - vegetable salad (lemon, lettuce, tomato, cucumber, carrot)		-vegetable salad -150g fish -2 table spoon olive oil -cup of bulgur - cup of yogurt
Snack	-A cup of low-fat yogurt -1 Apple	- green detox (Kiwi, spinach, lemon, ginger, water) (Put all ingredients in pitcher, about 2min)	-1 piece of dark chocolate		beet detox (1 red beet, medium, 1/2 Apple, 1 carrot, 1/2 orange, inch piece fresh ginger, 1cup of water) (Put all ingredients in pitcher, about 2min)	-green detox (Kiwi, spinach, lemon, ginger, water) (Put all ingredients in pitcher, about 2min)	-piece of fruit -cup of green tea		-piece of fruit	
Dinner	-1/2 cup of boiled bulgur -1cup of vegetable soup with olive oil -1cup of boiled beetroot (salad) -100g tuna with water -11almond -1cup of green tea	-vegetable salad (cucumber, lettuce, tomato, carrot, beet, lemon, dried thyme) -1cup soup of red kidney beans -150g tuna with water -1cup of green tea	Tabbouleh: (2 table spoon bulgur, cucumber, tomatoes-mint, green onion, lemon juice, 1table spoon olive oil, salt& pepper) -100g salmon -1 cup of green tea		-1 cup of lentil soup (onion, carrots, parsley, cloves garlic, fresh ginger, tomato, red lentil, spinach, spices, chicken broth) -salad of vegetable -2 piece of black toast -15g low-fat cheese	Tuna with avocado salad (1avocado, 1can tuna in water, 1/2 cup chopped parsley, 1small onion, 1table spoon mustard, 2 tea spoon, olive oil, sea salt, pepper)	-100g tuna -1 table spoon olive oil -1/2 cup of corn -salad -1 cup of macaroni		-cup of white bean broth - 1 piece of potato boiled - salad -2/3 cup of brown rice -cup of green tea

https://doi.org/10.25130/tjps.v29i6.1675

Designed by me

Note
Drink enough water and fluids (8-12) glass a day
Do not add too much spice and salt in your food
Have your food in slowly and consciously

Week Home Workout Plan

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	
Week1	Walking Core Workout Cardio 20-25min	Walking Upper body workout Cardio20-25min	Walking Lower body workout Cardio 20-25min	Walking Core Workout Cardio 20-25min	Walking Upper body workout Cardio 20-25min	Walking Lower body workout Cardio 20-25min	Saturday Rest
Week2	Walking Core Workout Cardio 30min	Walking Upper body workout Cardio 30min	Walking Lower body workout Cardio 30min	Walking Core Workout Cardio 30min	Walking Upper body workout Cardio 30min	Walking Lower body workout Cardio 30min	
Week3	Walking Core Workout Cardio 30-35min	Walking Upper body workout Cardio30-35min	Walking Lower body workout Cardio 30-35min	Walking Core Workout Cardio 30-35min	Walking Upper body workout Cardio30-35min	Walking Lower body workout Cardio 30-35min	
Week4	Walking Core Workout Cardio 40-45min	Walking Upper body workout Cardio40-45min	Walking Lower body workout Cardio 20-25min	Walking Core Workout Cardio 40-45min	Walking Upper body workout Cardio40-45min	Walking Lower body workout Cardio 40-55min	

References

[1] Cena, H. and Calder, P.C. (2020). Defining a healthy diet: evidence for the role of contemporary dietary patterns in health and disease. *Nutrients*, *12*(2), p.334. https://doi.org/10.3390%2Fnu12020334

[2] Clemente-Suárez, V.J., Beltrán-Velasco, A.I., Redondo-Flórez, L., Martín-Rodríguez, A. and Tornero-Aguilera, J.F. (2023). Global impacts of western diet and its effects on metabolism and health: a narrative review. *Nutrients*, *15*(12), p.2749. https://doi.org/10.3390/nu15122749

[3] Rezaieg, N.S. (2022). The Effect of Sweet-tasting Foods Addiction on Appetite-related Hormones among Obese Adolescents. *Al-Anbar Medical Journal*, *18*(1), pp.15-20. http://doi.org/10.33091/amj.2021.174525

[4] Silva, F.M., Adegboye, A.R.A., Curioni, C., Gomes, F., Collins, G.S., Kac, G., Cook, J., Ismail, L.C., Page, M.J., Khandpur, N. and Lamb, S.S. (2023). Describing the landscape of nutrition or diet-related randomised controlled trials: meta-research study of protocols published between 2012 and 2022. *medRxiv*, pp.2023-06. http://doi.org/10.1101/2023.06.08.23291109

[5] ElSayed, N.A., Aleppo, G., Aroda, V.R., Bannuru, R.R., Brown, F.M., Bruemmer,

D., Collins, B.S., Hilliard, M.E., Isaacs, D., Johnson, E.L. and Kahan, S. (2023). Obesity and weight management for the prevention and treatment of type 2 diabetes: standards of care in diabetes—2023. *Diabetes care*, *46*(Supplement_1), pp. S128-S139. https://doi.org/10.2337/dc23-S008

[6] Who, J., & Consultation, F. E. (2003). Diet, nutrition and the prevention of chronic diseases. *World Health Organ Tech Rep Ser*, *916*(i-viii), 1-149.

[7] Clemmons, D. R. (2011). Consensus statement on the standardization and evaluation of growth hormone and insulin-like growth factor assays. Clinical chemistry, 57(4), 555-559. https://doi.org/10.1373/clinchem.2010.150631

[8] Souberbielle, J. C., Fayol, V., Sault, C., Lawson-Body, E., Kahan, A., & Cormier, C. (2005). Assay-specific decision limits for two new automated parathyroid hormone and 25-hydroxyvitamin D assays. Clinical chemistry, 51(2), 395-400. https://doi.org/10.1373/clinchem.2004.037606

[9] Katz, A., Nambi, S. S., Mather, K., Baron, A. D., Follmann, D. A., Sullivan, G., & Quon, M. J. (2000). Quantitative insulin sensitivity check index: a simple, accurate method for assessing insulin sensitivity in humans. The Journal of Clinical Endocrinology & Metabolism, 85(7), 2402-2410. https://doi.org/10.1210/jcem.85.7.6661

[10] Nauck, M., Warnick, G. R., & Rifai, N. (2002). Methods for measurement of LDL-cholesterol: a critical assessment of direct measurement by homogeneous assays versus calculation. *Clinical chemistry*, *48*(2), 236-254. https://doi.org/10.1093/clinchem/48.2.236

[11] Jia, G., Sowers, J.R. and Whaley-Connell, A.T. (2024). Obesity in Hypertension: The Role of the Expanding Waistline Over the Years and Insights Into the Future. *Hypertension*, *81*(4), pp.687-690. https://doi.org/10.1161/HYPERTENSIONAHA.123.21719

[12] Shimi, G., Sohouli, M. H., Ghorbani, A., Shakery, A., & Zand, H. (2024). The interplay between obesity, immunosenescence, and insulin resistance. Immunity & Ageing, 21(1), 13. https://doi.org/10.1186/s12979-024-00414-7

[13] Li, X., Zhou, B., Yao, Y., Wang, G. and Meng, H. (2023). Reduced Growth Hormone Predicts Worsening Adipose Tissue Insulin Resistance in Adults with Obesity. *Obesity Facts*, *16*(4), pp.401-410. https://doi.org/10.1159/000530734

[14] Al-Samerria, S. and Radovick, S. (202)3. Exploring the therapeutic potential of targeting GH and IGF-1 in the management of obesity: insights from the interplay between these hormones and metabolism. *International journal of molecular sciences*, *24*(11), p.9556. https://doi.org/10.3390/ijms24119556

[15] Alsaffar, S.F., Jumaa, H.M. and Baqer, N.N. (2024). Detection of Leptin and Ghrelin Hormones and the Expression of their Receptors in Iraqi Obese Individuals. *Iraqi Journal of Science*. https://doi.org/10.24996/ijs.2024.65.1.4

[16] Couto-Rosende, Y., Garcia-Tirado, D., Palacio-Marco, M., Caixàs, A., & Corripio, R. (2023). A Personalized Approach to Determining the Caloric Needs of Children with Prader–Willi Syndrome Treated with Growth Hormone. Journal of Clinical Medicine, 12(12), 3967. https://doi.org/10.3390/jcm12123967 .

[17] Al-Amiri, R.M., Kadhum, H.S. and Ali, F.M. (2024). The role of gut hormonal aspect in Iraqi patients subjected to sleeve Gastrectomy. *Baghdad Science Journal*. https://doi.org/10.21123/bsj.2024.8990

[18] Zhang, C., Jing, H., Li, Y., Li, X., Xie, G. and Liang, J. (2023). Observational study on obesity: Insights from middle-aged and elderly college staff in Beijing. *Medicine*, *102*(52), p.e36792. https://doi.org/10.1097/MD.0000000000036792

[19] Pramono, A., Fitranti, D.Y., Nugroho, K.H., Sobirin, M.A. and Syauqy, A. (2023). The Association between Unhealthy Food Consumption and Impaired Glucose Metabolism among Adults with Overweight or Obesity: A Cross-Sectional Analysis of the Indonesian Population. *Journal of Obesity*, *2023*(1), p.2885769. https://doi.org/10.1155/2023/2885769.

[20] Rezaieg, N.S. (2021). Effect of Two Types of Diet on Cholecystokinin (CCK) Level in Three Groups of Males. *Journal of the university of Anbar for Pure science*, *15*(2). https://doi.org/10.37652/JUAPS

[21] Li, H., Zhang, W. and Yan, J. (2024). Physical activity and sedentary behavior among school-going adolescents in low-and middle-income countries: insights from the global school-based health survey. *PeerJ*, *12*, p.e17097. https://doi.org/10.7717/peerj.17097

[22] Gajewska, D., Lange, E., Kęszycka, P., Białek-Dratwa, A., Gudej, S., Świąder, K., ... & Myszkowska-Ryciak, J. (2024). Recommendations on dietary treatment of obesity in adults: 2024 position of the Polish Society of Dietetics. Journal of Health Inequalities, 10(1), 22-47 https://doi.org/10.5114/jhi.2024.141201 .

[23] de Mendonça, M., Rocha, K. C., de Sousa, É., Pereira, B. M., Oyama, L. M., & Rodrigues, A. C. (2020). Aerobic exercise training regulates serum extracellular vesicle miRNAs linked to obesity to promote their beneficial effects in mice. American Journal of Physiology-Endocrinology and Metabolism, 319(3), E579-E59 https://doi.org/10.1152/ajpendo.00172.2020 .

[24] Lavie, C.J., Laddu, D., Arena, R., Ortega, F.B., Alpert, M.A. and Kushner, R.F. (2018). Healthy weight and obesity prevention: JACC health promotion series. *Journal of the American College of Cardiology*, *72*(13), pp.1506-1531. https://doi.org/10.1016/j.jacc.2018.08.1037