

The Effect of Using a Suggested Sport's Diet on Increased Thyroid Secretion and Its Effect on Obesity

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ABSTRACT

Hormones regulate vital functions within the body in a balanced manner and within limited physiological limits. Excessive secretion of the hormone or deficiency leads to complications that hinder the vital processes carried out by the body. This study aimed to Understand the effect of using a suggested sports diet on increasing thyroid secretion and its effect on obesity.

METHODS: The researchers used the experimental method due to its suitability to the nature of the research by designing two groups, one of which is an experimental group and the other is a control group using previous and post measurements. The research community included the university students in the academic year 2019/2020, whose number was (60) female students. The basic research sample was chosen by the intentional method (40) students and they were divided equally into two groups, the experimental group consisting of (20) students and the control group consisting of (20) students and an exploratory sample of (20) students from outside the basic sample and from the research community to ensure the scientific treatment of the tests Physical and pathological under study.

RESULTS: the hypotheses between the pre-and post-measurements of the control group in the physical variables are statistically significant differences, as the calculated Z Value was higher than its tabular value at the level of 0.05, and this indicates the improvement of the control group in the physical variables under investigation. The researchers attribute this improvement to the control group to the presence of the researcher in the tests as well as to correct the form of performance and fix errors that appear first-hand, which had an impact on the mastery of the control group sample of the physical variables under discussion. **Conclusions:** The nutritional program has a positive effect on improving the activity of the thyroid gland and the secretion of its hormones in the body. The exercise program has a positive effect on some elements of physical fitness (muscle strength - flexibility). The sports program using Swiss balls has a positive effect on some elements of physical fitness (muscle strength - flexibility). The proposed sports and diet program together are stronger than alone to improve thyroid gland activity and secretion

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of its hormones. The proposed sports and nutritional program have a positive effect in reducing the level of moderate obesity on healthy people.

FIRST: INTRODUCTION AND RESEARCH PROBLEM:

The practice of sports activities on a regular and continuous basis stimulates many positive effects for the human body. It improves its functional capabilities and its health and psychological state, and the science of training and the physiology of sport is an important science. If physical exertion has attracted the interest of scientists since past centuries when they studied how the body functions when performing the physical effort, noting the changes that occur during it, recording and studying them, especially the positive effects of practicing daily exercise^(1,2)

The endocrine system and the nervous system are two important systems that regulate and coordinate all vital functions within the body. The endocrine system, through the hormones it secretes, plays an important and effective role in maintaining the biological and vital balance through the physiological processes that it performs. Whether in normal cases or when the organism is exposed for abnormal environmental influences inside or outside the body. For example: maintaining a regular physiological concentration of glucose in the blood, which only comes through the coordination of pancreatic cells in the secretion of the hormone insulin that works to reduce it, or glycogen to work to increase it.^(3,4)

Obesity refers to an increase in body weight beyond the normal limit due to the accumulation of fat, and is defined as an increase in the weight of a person by more than 30% of the ideal weight. The accumulation of fat in the body results from an increase in the size of fat cells due to the increase in their number. The normal human body contains about 30-35 billion fat cells. Its size increases when you gain weight, and with the continuation of the increase, new fat cells are formed, and these new cells are difficult for the body to get rid of later, and thus it becomes clear why it is difficult to lose weight after the large increase.⁽⁵⁾

Thyroid hormones work on cell growth and the regulation of oxygen consumption in addition to temperature regulation. These hormonal changes occur in response to regular physical activity. The thyroid gland secretes two main hormones, T4 thyroxine, which is secreted in quantities equivalent to about 80% of thyroid hormone, and T3 is excreted in quantities equivalent to 20 % Of thyroid hormone, although the biological action of these two hormones is equal, but the difference between them is in the speed and intensity of the action, so we find that the effectiveness of T3 is equivalent to about four times the effectiveness of thyroxine, which is equivalent to the duration of its stay in the blood four times the duration of stay of T3⁽⁶⁾

Iodine is one of the important nutrients needed for the metabolism process and has important effects on the thyroid gland, which combats harmful germs. About 65% of iodine in the human body is stored in the thyroid gland. It has many health benefits that play an important role in the functioning of the thyroid gland, which secretes hormones and controls the basic metabolism rate of the body, so it enters into the formation of thyroid hormones responsible for metabolism in the body.⁽⁷⁾

And sport has a clear effect on its practitioners, as it is noticed that those who practice aerobic sports regularly have physiological changes related to the heart, blood,

vital capacity, and blood pressure. The heart leads to a greater fullness of the heart and thus increases the resistance of the arteries, which in turn expand and increase their size. Hence the importance of exercise and movement activity in maintaining the health aspects of the individual and increasing the efficiency of his vital organs and following the importance of aerobic exercise an improvement in the rate of respiration rate, some physiological variables and the level of cholesterol. (TRIGL, LDL, HDL).⁽⁸⁻¹⁰⁾

It is characterized by food counseling that aims to help individuals acquire new eating habits, acquire information on the importance of food and its components, raise the health and nutritional level of the individual, and modify and change misconceptions related to food.^(11,12)

Exercise indicates that it directly affects the thyroid gland, making it more active in the secretion of its hormones, which work to regulate all metabolic processes in the body, which is due to the rate of significant improvement in thyroid activity and hormone secretion, as well as the proportion of cholesterol and triglycerides, as well as with the presence of the food supplement (iodine salt) which enters into the synthesis of thyroid hormones.⁽¹³⁾

Also, sports activity affects the metabolic energy of a person by increasing the expenditure of energy generated after exercise, and that the exercise of sports activity an important role in the secretion of thyroid hormones (T.S.H, T3, T4) and this confirms the clear effect of effort.⁽¹⁴⁻¹⁶⁾

Obesity is considered one of the common health problems among different peoples of the world, and that the thyroid gland is the vital and important variable for athletes, and knowing the vital effects that take place on this variable gives valuable information to those who work in the sports environment and a remarkable indication about the importance of practicing sports activities and interest in the changes that occur in the deficiency of Thyroid gland hormone in the case of obesity in athletes and obese people are more susceptible to developing immune hypothyroidism, and therefore it is necessary to pay attention to thyroid secretions and work to increase them in the sufficient and permissible limit for the body to maintain the secretion of hormones and the extent of their impact on moderate obesity for athletes and is concentrated in the lack of a healthy culture among people who suffer Obesity and overweight. The problem of overweight and obesity is one of the most important problems that negatively affect an individual's life, especially for athletes.^(17,18)

Therefore, after studying this topic, the researcher found out the use of a diet based on reducing the calories consumed by athletes who suffer from moderate obesity and eating foods that help raise the level of thyroid hormones T3-T4 in the body and the performance of an athletic system based on aerobic exercises using Swiss balls and is based on exertion. Exercise and exercise for those with increased thyroid hormone secretion from athletes.^(19,20)

Research Importance:

Hormones regulate vital functions within the body in a balanced manner and within limited physiological limits.

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Excessive secretion of the hormone or deficiency leads to complications that hinder the vital processes carried out by the body.⁽²¹⁻²³⁾

And that a balanced and integrated diet is one that contains all the nutrients in sufficient and permissible quantities, and there is no single integrated meal that covers all the daily needs of the individual, but by taking care of the elements of the three meals and distributing the nutrients to them, the balance becomes present in the daily food, and where A large increase in one ingredient at the expense of the remaining nutrients may lead to many health problems and problems, such as obesity and malnutrition.^(6,9,21)

Hence the importance of research in creating an aerobic exercise program and a regulated diet to treat obesity resulting from increased thyroid secretion and the extent of its impact on athletes. We see the importance of nutrition, which plays a major role in maintaining human health, and whenever nutrition is associated with exercise for health, it has an important role in controlling the body composition in terms of obesity and thinness.^(10,24)

Research Objective:

Understanding the effect of using a suggested sports diet on increasing thyroid secretion and its effect on obesity.

Research Hypotheses:

- There are statistically significant differences between both the previous and post measurements of the experimental group that uses a proposed sports diet on increasing thyroid secretion and the extent of its effect on obesity in favor of the post-measurement.
- There are statistically significant differences between both the previous and post measurements of the control group that uses a proposed sports diet on increasing thyroid secretion and the extent of its effect on obesity in favor of the post-measurement.
- There are statistically significant differences between both the previous and post measurements of the control group that uses a suggested diet and the experimental group that uses a proposed sports regime on increasing thyroid secretion and its effect on obesity in favor of the experimental group.

Search Procedures:

Research Methodology:

The researcher used the experimental method due to its suitability to the nature of the research by designing two groups, one of which is an experimental group and the other is a control group using previous and post measurements.

Research Community:

The research community included the university students in the academic year 2019/2020, whose number was (60) female students.

The Research Sample:

The basic research sample was chosen by the intentional method (40) students and they were divided equally into two groups, the experimental group consisting of (20)

students and the control group consisting of (20) students and an exploratory sample of (20) students from outside the basic sample and from the research community to ensure the scientific treatment of the tests Physical and pathological under study, the experimental group to apply the proposed food and training program, and the control group to apply the food program.

Methods of Data Collection:

The researcher conducted a comprehensive survey of studies and research related to the subject of the research and the variables to be measured to determine the appropriate tools, devices and tests to conduct this research.

Means and Tools for Measuring Growth Variables:

- medical scale to measure weight.
- Aristamere device to measure length.
- 10 Swiss balls of different sizes (46 cm, 55 cm).
- A video camera.
- whistle.
- Stop Watch.
- A ruler is included to measure flexibility.
- Dynamometer device to measure the muscle strength of the back and abdomen.

Methods and tools for measuring thyroid variables:

- Laboratory devices for analyzing the thyroid gland.

Exploratory Study:

The researcher conducted an exploratory study from 5/5/2020 to 5/10/2020 on a sample from the research community sample consisting of (20) students and outside the basic research sample and the study targeted the following:

- Conducting scientific transactions (truthfulness - consistency) for the tests under investigation.

So, the researcher calculated the validity of the tests that measure the research variables on the research sample. The researcher used the validity of the differentiation, so the researcher applied the tests to an exploratory sample numbering (10) student. By finding the significance of the differences between the upper quartile and the lower quartile of the research sample using test (t), and this is explained by Table No. (1) following:

It is clear from Table (1) that the calculated value of (t) is greater than the tabular value of (t), as the calculated value of (t) is limited between (5.21 - 10,007), which indicates the existence of statistically significant differences between the upper quartile or the lower quartile in favor of the higher quartile in the tests. Physical examination at a significant level (0.05) indicating the validity of the tests under investigation.

Test Reliability:

The researcher used the test application method and re-application (test & re-test), so he performed the first application on the exploratory sample totaling (10) during the period of time on 7/10/2020 to re-apply the tests for the second time on the same sample in the period of time 7/20/2020, with a difference of ten days between the first and second applications, and this is explained by Table (2) as follows:

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Table 1. Indication of the differences between the upper and lower quartile PI (differentiation honesty) for physical tests (under consideration)

Tests	Unit of measurement	Upper quartile		Lower quartile		Different in average	T
		average	±SD	average	±SD		
The muscular strength of the two legs" ,the broad jump from stability	Cm	155	6.2	124.6	9.5	35.8	6.109
The muscular strength of the abdominal muscles" sitting from lying down	Amount	16.3	2.2	11.6	1.6	5	5.21
Muscular strength of the back muscles" dynamometer back	Cm	33.1	2.3	26.4	0.9	10.4	10.007
Flexibility" bend the torso forward from the long sitting	Cm	30.8	1.88	29.3	1.1	6.8	9.25

The tabular t value is at 0.05 level of significance and 3 = 3.18 degree of freedom.

Table 2. Correlation coefficient between the first application and the second application in the physical tests under investigation (N = 20)

Tests	Unit of measurement	First application		Second application		Pearson Correlation coefficient
		average	±SD	average	±SD	
The muscular strength of the two legs" ,the broad jump from stability	Cm	139.9	23.7	140.6	18.3	**0.908
The muscular strength of the abdominal muscles" sitting from lying down	Amount	12.6	3.2	11.2	3.07	**0.829
Muscular strength of the back muscles" dynamometer back	Cm	31	5.8	24.8	5.6	**0.931
Flexibility" bend the torso forward from the long sitting	Cm	33.7	3.8	27.6	5.1	0.911**

The tabular (t) value at 0.05 = 0.729

It is evident from Table No. (2) that there are no statistically significant differences between the averages of the first application and the second application of the physical tests (under consideration) at the level of (0.05) where the calculated value of (t) was greater than its tabular value, which indicates the stability of these tests (constraint The research), and this confirms the correlation coefficient between the first application and the second application, which ranged between (0.829 ** to 0.931 **), which indicates that the selected tests have high stability coefficients.

Steps to Application:

Previous Measurements:

The researcher conducted a pre-measurement for the basic study sample from 8/24/2020 AD to 8/27/2020 AD, where the measurements were made in two stages as follows:

The first phase, "Measuring Physical Variables", on (24/25/8/2020).

The second stage, "Measurement of Thyroid Variables". On (26/27/8/2020), the sample was drawn by the director of the laboratory and the technician.

Post measurements:

After completing the implementation of the program, the researcher conducted the dimensional measurements of the basic study sample for the two research groups under the same conditions as the pre-measurements from 9/5/2020 to 8/8/2020, where the measurements were made in two stages as follows:

The first stage, "Measuring Physical Variables" on (5/6/9/2020)

The second stage, "Measurement of Thyroid Variables". On (7/8/9/2020), the sample was drawn by the director of the laboratory and the technician.

Statistical Processors:

The researcher conducted statistical treatments using the Statistical Package for Social Sciences program to conduct statistical treatments (SPSS), statistical packing for social science, appropriate to the nature of the research. The data was processed statistically using:

- SMA. Pearson correlation coefficients.
- T test of differences. Coefficient of torsion.
- standard deviation. Mann-Whitney test.
- Wilkson test. Rate of improvement.

Presentation and Discussion of Results:

Presentation of the results of the first hypothesis of the physical variables

Table (3) shows that the differences between the pre and post measurements of the control group in the physical variables are statistically significant differences where the calculated value of z was higher than its tabular value at the level of 0.05 and this indicates the improvement of the control group in the physical variables under investigation, where the calculated (z) values came In physical tests between (- 2.820, - 2.869), which indicates the improvement of the control group members in the physical variables under investigation.

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Table 3. The significance of the statistical differences using Wilcoxon between the previous and post measurements of the control group in the physical variables. N = 20

Tests	Unit of Measurement	Number of references		Average ranks		Total ranks		Z	Significance level
		-	+	-	+	-	+		
The muscular strength of the leg muscles, "the broad jump from stability	Cm	0	20	0	5.5	0	110	-2.82	0.005
The muscular strength of the abdominal muscles " sitting from lying down	Amount	0	20	0	5.5	0	110	-2.831	0.005
Muscular strength of the back muscles "dynamometer back	Cm	0	20	0	5.5	0	110	-2.869	0.004
Flexibility" bend the torso forward from the long sitting	Cm	0	20	0	5.5	0	110	-2.836	0.005

The tabular z value at the significance level 0.05 = 2

Discussion of the results of the first hypothesis of physical variables:

The results of Table (3) indicate that the hypotheses between the pre and post measurements of the control group in the physical variables are statistically significant differences, as the calculated z value was higher than its tabular value at the level of 0.05, and this indicates the improvement of the control group in the physical variables under investigation, where the computed z value came in The muscular strength of the leg muscles (the broad jump from stability) -2.820, and the muscle strength test for the abdominal muscles (sitting from lying down) -2.831, and in the muscle strength test for the back muscles (the dynamometer back) -2.896, and in the flexibility test (bending the torso forward from a long sitting) -2.836, which indicates the improvement of the control group members in the physical variables under

investigation.

The researcher attributes this improvement to the control group to the presence of the researcher in the tests as well as to correct the form of performance and fix errors that appear first-hand, which had an impact on the mastery of the control group sample of the physical variables under discussion.

The researcher also attributed this improvement to the regularity of the control group members in the tests, as well as the use of the method used in relation to each test in the physical variables under study, and the researcher's followers of the program that contributed to improving the level of physical performance of the sample in the control group in the various physical variables under study and this is agreed In it the researcher with the results of the study¹⁴

Presentation of the results of the first hypothesis for thyroid variables:

Table 4. The significance of the statistical differences using Wilcoxon between the previous and post measurements of the control group in the T3-T4 variables. N = 20

Variables	Unit of Measurement	Number of references		Average ranks		Total ranks		Z	Significance level
		-	+	-	+	-	+		
TSH	Mu/ml	0	20	0	5.5	0	110	-2.803	0.005
T3	Ng/dl	0	20	0	5.5	0	110	-2.842	0.004
T4	Ug/dl	0	20	0	5.5	0	110	-2.812	0.005
Free T3	Ng/dl	2	18	14	5.33	14	106.6	-2.09	0.037
free T4	Ug/dl	0	20	0	5.5	0	110	-2.805	0.005

The tabular z value at the significance level 0.05 = 2.

Table (4) shows that the differences between the pre and post measurements of the control group in the T3-T4 thyroid variables are statistically significant differences where the calculated Z value was higher than its tabular value at the level of 0.05 and this indicates the improvement of the control group, as the value (z) computed in Thyroid T3-T4 variables between (- 2.090 - -2.842) the highest tabular (z) value, which indicates the improvement of the control group in the T3-T4 thyroid variables under investigation.

Discussion of the results of the first hypothesis of thyroid variables:

The results of Table (4) indicate that the differences between the pre and post measurements of the control group in thyroid hormones T3 - T4 are statistically

significant differences where the calculated z value was higher than its tabular value at the level of 0.05 and this indicates the improvement of the control group as the calculated z value came in each From TSH -2.803, T3 -2.842, T4 -2.812, FREE T3 -2.090, FREE T4 -2.805 indicating improvement of the control group in T3-T4 thyroid secretion variants under investigation.

Shalaby, M. N., et all (2020) ⁽¹⁵⁾ indicates that sport activity affects the metabolic energy of a person by increasing the expenditure of energy generated after exercise and that the exercise of sports activity plays an important role in the secretion of the thyroid hormones (T.S.H, T3, T4), which confirms the clear effect of effort.^(10,24,25)

The researcher attributed the changes that occurred in the blood picture for the experimental group to the

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proposed sports diet program, since as a result of regularity in the exercise of sports activity, blood conditioning and its volume increased, so the secretion of hormones stimulating the secretion of thyroid hormones increases, and this is in agreement with " Aboelyazed, A. M. (2010).⁽²⁶⁾

The thyroid gland secretes two main hormones, thyroxine T4, which is excreted in quantities equivalent to about 80% of thyroid hormone and triiodothyronine T3, and is excreted in quantities equivalent to 20% of thyroid hormone. T3 is approximately four times as effective as T4, which is 4 times more effective in the blood than T4.^(1,13,27)

This is consistent with what the researcher said with " Baiomy, A. A. & Hamad, M. N. E." (2009)⁵ that food counseling aims to help individuals acquire new eating habits, acquire information on the importance of food and its components, raise the health and nutritional level of

the individual, and explain misconceptions related to food.^(9,24)

The researcher also agrees with " Elbarawy, M. M. M. " (2012)⁽¹¹⁾ that patients suffering from obesity are more susceptible to developing immune hypothyroidism in people of normal weight, and studies indicate that the reason for the high level of the hormone leptin leads to an increase in their level in Blood refers to the activity of immune cells in the body, which attack the cells of the thyroid gland, which causes a deficiency in its work. It must be said that hypothyroidism, even if it is simple, can contribute to an increase in body weight.^(9,14)

The researcher believes that the more food meals are rich in vitamins, the more it helps in performing exercise, as sports training needs to consume a large number of vitamins, and that the deficiency that stimulates the thyroid gland is due to the low levels of the thyroid hormone T3-T4.⁽⁸⁾

Presentation, interpretation and discussion of the results of the second hypothesis:

Display results for physical variables:

Table 5. Significance of statistical differences using Wilcoxon between the previous and post measurements of the experimental group in the physical variables

Tests	Unit of Measurement	Number of references		Average ranks		Total ranks		Z	Significance level
		-	+	-	+	-	+		
The muscular strength of the leg muscles" ,the broad jump from stability	Cm	0	20	0	5.5	0	110	-2.81	0.005
The muscular strength of the abdominal muscles" sitting from lying down	Amount	0	20	0	5.5	0	110	-2.831	0.005
Muscular strength of the back muscles "dynamometer back	Cm	0	20	0	5.5	0	110	-2.807	0.005
Flexibility" bend the torso forward from the long sitting	Cm	0	20	0	5.5	0	110	-2.809	0.005

The tabular z value at the significance level 0.05 = 2.

Table (5) shows that the differences between the pre and post measurements of the experimental group in the physical variables are statistically significant differences where the calculated value of Z was higher than its tabular value at the level of 0.05, and this indicates the improvement of the experimental group in the physical variables under investigation, where the calculated value of (Z) came Between (-2.807, -2.831), which indicates the improvement of the experimental group in the physical variables under investigation.

Discuss the results of the second hypothesis of the physical variables:

Table (5) shows that the differences between the pre and post measurements of the experimental group in the physical variables are statistically significant differences where the value of the calculated Z was higher than its tabular value at the level of 0.05 and this indicates the improvement of the experimental group in the physical variables under investigation where the value of the calculated Z came in strength The muscular strength of the leg muscles "the broad jump from stability" -2.810, and in the muscular strength of the muscles of the abdomen "sitting from lying down" -2.831, and in the muscular strength of the muscles of the back "the dynamometer back" -2.807, and in the flexibility "bending the trunk forward from long sitting" -2.809 which It indicates an improvement in the experimental group in

the physical variables under investigation.

The researcher attributes that the improvement in the physical variables of the members of the experimental group is due to the effect of the sports program using tests, and the researcher attributes the development in the effectiveness of the program to special exercises developed on scientific foundations, as well as the method that the researcher adopts in building and developing the sample and accustoming them to face related exercises A high degree of difficulty for the purpose of developing ability and raising the level of physical fitness of the sample members.

The researcher also attributed that the development in the test results is due to the type of exercise that the experimental group sample underwent, and this is confirmed by "Saad, A. H." (2003)² that physical activity depends on its effect on the immune response and on many factors, and the most important of these factors is the level of fitness Physical fitness, where increasing the individual's physical fitness leads to an increase in the immune response in the positive direction and to the quality of the physical pregnancy in terms of the severity of the pregnancy.^(12,19)

The researcher also agrees with the study of " Shalaby, M. N., et al (2020)¹⁵ that those who had excessive thyroiodin in the blood had higher levels of FREE T3, which led to an increase in the secretion of TSH.^(1,8,28,29)

Presentation of the results of the second hypothesis of the thyroid variant:

Table 6. The significance of the statistical differences using Wilcoxon between the previous and post measurements of the experimental group in T3-T4 variables

Variables	Unit of Measurement	Number of references		Average ranks		Total ranks		Value of Z	Statistical significance
		-	+	-	+	-	+		
TSH	Mu/ml	0	20	0	5.5	0	110	-2.803	0.005
T3	Ng/dl	2	18	2	6	2	120	-2.703	0.007
T4	Ug/dl	0	20	0	5.5	0	110	-2.812	0.005
Free T3	Ng/dl	0	20	0	5.5	0	110	-2.803	0.005
free T4	Ug/dl	0	20	0	5.5	0	110	-2.803	0.005

The tabular z value at the significance level 0.05 = 2.

Table (6) shows that the differences between the previous and post measurements of the experimental group in the T3-T4 thyroid variables are statistically significant differences where the calculated Z value was higher than its tabular value at 0.05 level, and this indicates the improvement of the experimental group in the T3-T4 thyroid variables under investigation. Where the value of (Z) computed came between (-2.703, -2.812), which indicates the improvement of the experimental group in the secretion of the T3-T4 thyroid variants under investigation.

Discussion of the results of the second hypothesis for thyroid variables:

The results of Table (6) indicate that the differences between the previous and post measurements of the experimental group in T3-T4 thyroid hormones are statistically significant differences, as the calculated z value was higher than its tabular value at 0.05 level, and this indicates the improvement of the experimental group in the T3-T4 thyroid variables. The research where the calculated z value came in TSH -2.803, in T3 -2.703, in T4 -2.812, in FREE T3 -2.803, and in FREE T4 -2.803, indicating the improvement of the experimental group in

the secretion of T3-T4 thyroid variants under investigation.

The researcher attributes that the improvement in the T3-T4 thyroid variables for the members of the experimental group is due to the positive effect of the program. Thyroid stimulating hormone (TSH), thyroxine triiodide (T3), thyroxine (T4), growth hormone, and antibodies in case of MG deficiency.^(21,24,28)

The researcher also agrees with the study " Ayman, A. A., Darwish, et al" (2016)⁽¹⁴⁾ that those who have excessive thyrotropin in the blood have higher levels of (FT3), triglycerides, cholesterol and (FT3), which led to an increase in the thyroid stimulating hormone (TSH).^(17,18)

He also agrees with what was mentioned by " Marras, V. et al." (2010)⁽²³⁾. The biological importance of iodine is based on the fact that iodine is a component of the thyroid hormones, which are necessary for growth and for the functions of the brain and nervous system and for maintaining body temperature and vitality. From 150 to 250 micrograms per day, the lack of these hormones affects the body's systems and increases blood cholesterol and significantly increases weight for individuals.⁽¹⁾

Presentation and discussion of the results of the third hypothesis:

Presentation of the results of the third hypothesis for physical variables:

Table 7. Significance of statistical differences using Mann and Whitney between the two post measurements of the experimental and control groups in the physical variables

Tests	Unit of Measurement	Experimental group		Control group		U	Statistical significance
		Average ranks	Total ranks	Average ranks	Total ranks		
The muscular strength of the leg muscles" ,the broad jump from stability	Cm	15.4	308	6.4	128	11	0.002
The muscular strength of the abdominal muscles" sitting from lying down	Amount	13.1	262	7.9	158	27.5	0.089
Muscular strength of the back muscles "dynamometer back	Cm	14.2	284	7.4	148	19	0.019
Flexibility" bend the torso forward from the long sitting	Cm	13.8	276	5.8	116	11	0.002

N 1 = n 2 = 20

The tabular u value at the significance level 0.05 = 28

Table (7) shows that the differences between the experimental and control groups in the physical variables are statistically significant differences in favor of the

experimental group where the calculated u value was less than its tabular value at the level of 0.05 and this indicates the presence of significant differences and

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means the improvement of the experimental group to a higher degree than the control group in the variables Physical, where the arithmetic mean of the experimental group came in the physical variables and all of them were less than the tabular value of u (28), which indicates the improvement of the experimental group in the physical variables under investigation.

Discussion of the results of the third hypothesis of physical variables:

The researcher also agrees with the results of the study of "Amira Mohi Abu Al-Yazid" (2010)²⁶ that the use of exercise and sport activity leads to an increase and equivalence of the lack of secretion of the glands and the secretion of the thyroid stimulating hormone.

Shalaby, M. N., et al (2020)⁽¹⁵⁾ states that hormones play an important role in regulating body functions. Thyroid hormones are considered one of the hormones that raise the level of activities of the necessary body systems, and that physical activity stimulates the thyroid gland to secrete its hormones into the bloodstream and thus leads to an increase in the heartbeat. And stress, regulation of body temperature and metabolism processes that also have a role in fat oxidation^(2,3)

The researcher attributes the improvement of the experimental group compared to the control group in the

physical variables under investigation to the fact that the good planning of the program is highly proportional to the age stage and with the average obesity rate that the research sample suffers from, including exercises and then the graduation from simple too difficult as it works to raise physical fitness For the research sample, including an increase in thyroid secretion, and thus a significant decrease in weight occurs.

This also agrees with the results of the study "Ayman" (2015)⁽¹⁴⁾, where the researcher found that using the diet combined with sports activity led to weight loss and a healthy diet in terms of a balance between the amount of food and the type of food that has an important effect on the level of Leptin hormone.

The researcher also agrees with the results of the study "Ayman"(2015)⁽¹⁴⁾ that sports activity affects the metabolic energy of a person by increasing the expenditure of energy generated after exercise and that the practice of sports activity is an important role in the secretion of thyroid hormone.^(10,28)

The researcher believes that the lack of a healthy culture among people is considered a problem in overweight and obesity and one of the most important problems that negatively affect the individual's life, especially for athletes.

Presentation of the results of the third hypothesis for thyroid variables:

Table 8. Significance of the differences between the two post measurements of the experimental and control groups in T3-T4 variables

Variables	Unit of Measurement	Experimental group		Control group		U	Statistical significance
		Average ranks	Total ranks	Average ranks	Total ranks		
TSH	Mu/ml	15.4	308	5.6	112	0	0
T3	Ng/dl	15.15	303	5.4	108	3.5	0
T4	Ug/dl	15.5	310	5.5	110	0	0
Free T3	Ng/dl	14.6	292	8	160	15	0.007
free T4	Ug/dl	15.8	316	5.5	110	0	0

The tabular U -value at the significance level $0.05 = 28$.

Table (8) shows that the differences between the experimental and control groups in the T3-T4 variants of the thyroid gland are statistically significant differences in favor of the experimental group where the calculated u value was less than its tabular value at the level of 0.05 and this indicates the presence of significant differences and means improvement of the experimental group to a higher degree than the group Controls in T3-T4 thyroid variants, where the arithmetic mean of the experimental group came in the rate of T3-T4 thyroid variables, and all of them were less than the tabular u value (28), indicating the improvement of the experimental group in stimulating the secretion of the pituitary gland to produce the thyroid stimulating hormone under investigation.

Discussion of the results of the third hypothesis of thyroid variables:

The thyroid gland is one of the most important endocrine glands, as its secretion reaches all cells of the body wherever it is, which works to reduce cholesterol in the blood and helps alertness, attention, focus, activity, energy burning and body composition, and cyst cells are responsible for the secretion of thyroid hormones such as thyroxine and triiodothyronine. This gland is considered an endocrine gland whose secretions directly enter the blood without the need for special channels for a transfusion.⁽¹⁷⁾

As Mustafa Salih (2003)⁵ also notes that iodine deficiency

and the consequent cellular changes in the thyroid gland leads to many clinical symptoms, the most important of which is a decrease in growth rates, while if a person consumes iodine in his diet, this leads to an improvement in the activity of thyroid hormones and thus Works to improve the general condition of the body.^(5,26)

This is consistent with the results of the study "Muhammad Mahmoud Muhammad Al-Barbawi" (2012)⁽¹¹⁾, where the results showed a significant increase in blood glucose and insulin levels, and the HOMA-IR ratio in fatty substances with positive HPYLORI compared with other groups and a depressing lipid profile that included serum cholesterol and triglycerides. And lipid cholesterol in fatty substances in order to determine the effect of obesity on the thyroid gland in children and adolescents.

The researcher also sees that the individual's ability to perform decreases as the percentage of body fat increases and the ability to metabolize the body decreases, which drives the individual to carry out movement and exercise activities.

The researcher also agrees with the study of "Shalaby, M. N. & Fadl, M. A. (2020)⁽¹⁶⁾ that following a diet to lose weight, and obese women who suffer from an imbalance of thyroid hormones, should perform a modified diet and diet and engage in physical activity to lose weight.

The researcher also believes that the use of the proposed diet together with sports activity in a scientific way helps greatly in losing weight and secreting thyroid stimulating

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hormone.

FIRST: THE CONCLUSIONS

Through the objectives and assumptions of the research, and according to the references to the collected data and statistical treatments, and in the light of presenting and discussing the results and within the limits of the research sample, the following conclusions could be reached:

- 1-The nutritional program has a positive effect on improving the activity of the thyroid gland and the secretion of its hormones in the body.
- 2-The exercise program has a positive effect on some elements of physical fitness (muscle strength - flexibility).
- 3-The sports program using Swiss balls has a positive effect on some elements of physical fitness (muscle strength - flexibility).
- 4-The proposed sports and diet program together are stronger than alone to improve thyroid gland activity and secretion of its hormones.
- 5-The proposed sports and nutritional program have a positive effect on reducing the level of moderate obesity on healthy people.

SECOND: RECOMMENDATIONS

Based on the findings of the researcher and within the limits of the research sample, the researcher concluded the following: -

- 1-Conducting similar research at different age stages to develop their physical and mobility capabilities.
- 2-The nutritional program is very important to the general health of the body and the regulation of thyroid hormones.
- 3-Exercise is very important for the general health of the body and the regulation of thyroid hormones.
- 4-Using the Swiss ball to develop physical fitness and work to lose weight.
- 5-The use of iodine in food because it is one of the important elements involved in the synthesis of thyroid hormones.
- 6-Guidance on the proposed sports program to improve the activity of the thyroid gland and the secretion of its hormones.
- 7-The combination of the proposed diet and exercise program next to the doctor's treatment, because it gives better results for improving thyroid gland activity and secretion of its hormones.

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APPENDIX

Attachment (1)

Forms recording age variables, height, weight and body mass index

For the experimental and control group before and after conducting the experiment

A form for recording age variables, height, weight and body mass index of the control group before conducting the experiment (pre-measurement)

N	names of the students	Variables			
		Height Cm	Weight Kg	Age Year	BMI Kg
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

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Attachment (2)

Physical tests

Muscular strength is a test of the wide jump of stability

Purpose:

Measurement of force characteristic of velocity of the leg muscles

Tools:

Flat floor that does not expose the individual to slipping - tape measure - draws the starting line.

Performance specifications:

The laboratory stands behind the starting line, the feet are slightly apart, the arms are high, the arms are swinging in front of the bottom and behind, with the knees bent in half and the torso tilted forward until it reaches what resembles the starting position for swimming. Ahead as far as possible.

Test instructions:

The distance of the jump is measured from the starting line (the inner edge) to the last trace of the player's legacy near the starting line or at the point where the heels touch the ground.

- In the event that the laboratory is out of balance and touches the ground with another part of its body, the attempt is considered null and must be repeated.

The feet must be in contact with the ground until the moment of elevation.

Muscle strength test for abdominal muscles

"Sit cross-legged"

(From a bent knee position)

Purpose:

Measurement of muscle strength of groups of abdominal muscles.

Tools and Hardware:

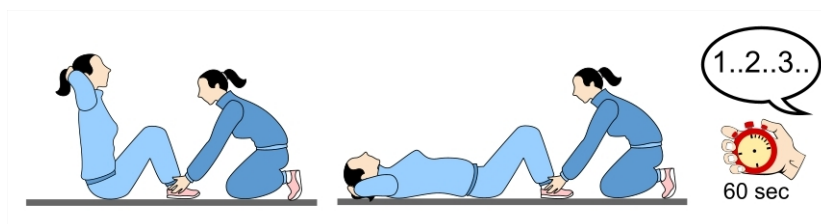
Stopwatch, tidy or flat.

Performance specifications:

The laboratory lies on his back above the mattress or (flat level) from a squatting position, the distance between the feet is 30 cm, with hands interlocking behind the neck and the colleague is holding the feet of the laboratory, and when the laboratory is given the start signal, it bends the trunk to reach a squatting position and the knees are bent according to the last adjustment, then Repeat this as many times as possible.

Register:

Scores the number of times the correct performance.



Muscular strength test for back muscles

Purpose:

Measurement of muscle strength, the material (extensor) of the torso (back muscles).

Tools and Hardware:

Dynamometer device

Performance specifications:

The person stands upright on the base of the dynamometer, then bends the trunk forward and down to grip the iron bar with two hands.

- The length of the iron chain that connects the iron bar to the dynamometer is adjusted in a way that enables the laboratory to pull up from the position of bending the trunk and extending the knees.

- When the starting signal is given, the tester pulls the hands up so that the tension movement is from the torso and not from the legs, and the tension is slowly to produce the maximum possible force.

- Test instructions:

- You must keep the knees straight and the feet on the base of the dynamometer.

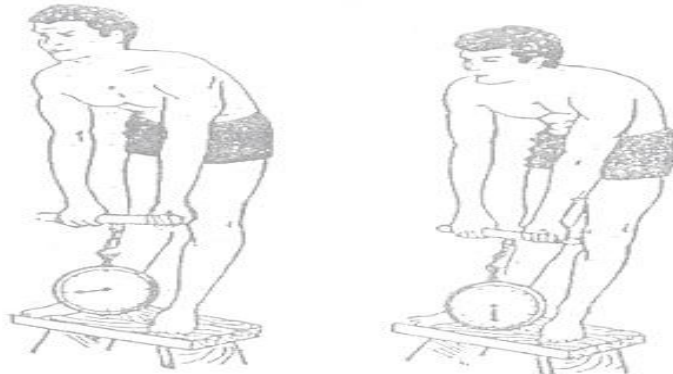
- Arresting the iron bar by the military method, meaning that the back of one hand is outside.

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- The head with the torso should be straight.

Scoring:

The laboratory scores the best attempt (for each laboratory 2-3 attempts).



Flexibility test of torso bending forward from a sitting position open

Purpose:

Measurement of back and thigh flexibility in forward bending movements from a long sitting position.

Tools:

Ruler included.

Performance specifications:

The laboratory sits long with the back straight and hands on the side touching the ground.

The laboratory tries to straighten the arms forward and bend the torso forward to reach as far as possible.

Register:

Measure the distance from the beginning of the heels to how far the laboratory can reach a fingertip, and record the results of the best numbers for three consecutive attempts.

