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THE EFFECT OF IODINE FORTIFICATION ON THE LEVEL OF THYROXINE AND CERTAIN BIOCHEMICAL AND FUNCTIONAL VARIABLES OF VOLLEYBALL PLAYERS (YOUTH CLASS)

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ABSTRACT

Iodine is a vital and essential element involved in the production of the thyroid hormone, which is necessary for physical and mental development, as well as the development of various important body function. Therefore, iodine deficiency does not only lead to dangerous complications of the thyroid swelling, but also affects the level of intelligence and academic achievements of school children, and causes fatigue and inertia in general, preventing them from being productive or working properly. This factor hinders their development and has eventually negative influences on society both socially and economically.

The problem of this research is the fact that minerals are crucial for the human body, as they perform great physiologic functions (especially for athletes). Scientific sources point out that thyroxine affects the percentage of minerals within the human body in such a way that whenever the ratio of this hormone increases, the level of minerals will increase as well. As is mentioned earlier, iodine is crucial for the activity of the thyroid gland and the secretion of thyroxine. Therefore, researchers attempted to increase the level of thyroxine secretion on a low ratio, but still within the normal limits, in order to study its influence on the level of minerals and certain functional variables of volleyball players of the youth class.

The purposes of this research are:

1. Identifying the level of iodine and thyroxine, and certain biochemical and functional variables of volleyball players of the youth class.
2. Identifying the effect of iodine fortification on the thyroxine level, and certain biochemical and functional variables of volleyball players of the youth class.

The hypothesis of this research is that there are certain significant differences between the results of the pretest and posttest on the level of thyroxine and certain biochemical and functional variables of volleyball players of the youth class. The researchers concluded that iodine fortification affected the level of specific functional variables, as well as certain biochemical variables of volleyball players, positively.

Keywords: Iodine Fortification, Thyroxine.

INTRODUCTION

The thyroid gland secretes two vital hormones, namely thyroxine and triiodothyronine, also known as (T3) and (T4). Thyroxine represents about 93% of the hormones produced by the thyroid gland, meanwhile triiodothyronine represents 7% of it. The thyroid gland has many functions, including its role in the respiratory system, its influence on the increase of effective ion transport across cell membranes, and its effect on the metabolism of fats and glucose.

Iodine is a vital and essential element involved in the production of the thyroid hormone, which is necessary for physical and mental growth and development, as well as the development of various important body function. Therefore, iodine deficiency does not only lead to dangerous complications of the thyroid swelling, but also affects the level of intelligence and academic achievements of school children, and causes fatigue and inertia of adults, preventing them from being productive or working properly. This factor hinders their development and has eventually negative influences on society both socially and economically.

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RESEARCH PROCEDURES:

2.1: Research Population and Sample:

The research population has been selected out of 60 athletes from five volleyball clubs which participated in the league of 2016 within Al-Forat Al- Awsat. The research sample, consisting of 14 athletes, has been selected randomly at Al Kufa Sport Club. The researchers were assisted by a physician who would follow-up the athletes' health, including the levels of iodine and thyroxine, and certain biochemical and functional variables afore starting the experiment, in order to refer to the possible health problems that might be faced by those research participants.

The research sample has been split up randomly into two groups of 7 athletes each, forming the control group and the experimental group. The experimental group will be under the influence of the iodine fortification, meanwhile the control group will not face any changes. Both groups will undergo the same training sessions without the intervention of the researchers.

Afterwards, the results of both groups will be compared with one another, pointing out the differences in the posttest, yet taking into account their equivalence in the pretest.

2.1.1:Sample Homogeneity:

The research sample has been divided into two groups, the control group and the experimental group. In order to avoid any factors that might affect the results of this research due to individual differences among the athletes, and in order for the sample to reach one, equal level, certain variables have been selected to represent the sample's characteristics to ensure their homogeneity concerning these variables specifically, as it might eventually affect the research's results and should thus be controlled. The collected data has been treated statistically by using the skewness, for its value among the variables (weight, length, age) was confined to (±1). Thus, this group has been distributed normally.

2.1.2: Sample Equivalence:

The researchers equaled both sample groups by determining the variables that might possibly affect the research, like extraneous variables. Depending on previous studies and the opinions of certain experts, the researchers set these variables into two: anthropometric measurements (weight, length, age), and the levels of thyroxine, iodine, and certain functional and biochemical variables. The researchers used the T-test for independent samples in order to calculate their equivalence, and the results point out that both sample groups are equivalent in these variables indeed.

2.2: Used Measurements:

The researchers measured the following aspects:

1. The level of T4 (Thyroxine hormone) secreted by the thyroid gland.
2. The level of iodine in the body.
3. Functional variables, like:

- Heart rate
- Cardiac output

2.3: Research Implementation Plan:

In order to meet the research's purposes, the researchers followed the following steps:

- They worked out their iodine fortification method, with the help of experts concerning the specific amount of iodine added to the athletes' diet, and the timespan of the fortification, in order to result in appropriate percentages. This method had been implemented over two weeks, through one unit per day, 14 units in total.

2.4: Pretest:

The pretest took place on 20/01/2016, at 15:00 exactly. The procedure occurred as follows; first, the fourteen athletes of Al Kufa Sport Club gathered together, and they were introduced to the stages of this experiment. The medical staff started their pre-examination of their heart rate, blood pressure, and temperature, in order to ensure of their health condition. Later, blood samples of (5cc) each were taken from each athlete, which took about 15 minutes. Afterwards, the medical staff noted the players' heart rate, and added these information to the data form, so that it could be transferred to other schedules to be treated statistically.

2.5: Implementation of Suggested Training Method:

After finishing the pretest, the researchers applied their iodine fortification method on the research participants of the experimental group by assigning an expert to provide them with

the correct amount of iodine in their diet, giving them a cup of milk with added iodine once a day for two weeks.

2.6: Posttest:

The posttest took place on 05/02/2016, at 15:00 exactly. In order to guarantee taking the posttest in exactly the same circumstances as the pretest, the researchers took again a blood sample of the research participants, and measures the functional variables (heart rate).

3. DISCUSSION OF RESULTS:

3.1: Discussion and Analysis of the Pretest and Posttest Results for the Research Variables of the Control Group:

Table (1) Shows the means, standard deviations, T-values and the statistical significance of the results of the pretest and posttest of the control group:

Variables	Units	Pretest		Posttest		T Value	Sig.	Significance level
		M	SD	M	SD			
T4	Ng/ml	4.17	1.1	3.98	1.35	1.73	0.16	Non-Significance
Iodine	Ng/ml	168.59	17.2	174.51	15.35	0.38	0.298	Non-Significance
Heart rate	Unit	74.22	2.45	73.54	3.01	0.48	0.71	Non-Significance
Cardiac Output	3 ml	5364	308.98	5288	409.46	1.37	0.12	Non-Significance

3.2: Discussion and Analysis of the Pretest and Posttest Results for the Research Variables of the Experimental Group:

Table (2) Shows the means, standard deviations, T-values and the statistical significance of the results of the pretest and posttest of the experimental group:

Variables	Units	Pretest		Posttest		T Value	Sig.	Significance level
		M	SD	M	SD			
T4	Ng/ml	4.03	1.46	4.73	1.12	3.15	0	Significance
Iodine	Ng/ml	165.69	19.31	189.37	22.96	2.9	0	Significance
Heart rate	Unit	74.74	2.87	75.02	2.93	1.99	0.032	Non-Significance
Cardiac Output	3 ml	5526	289.32	5982	312.49	3.97	0.001	Significance

3.3: Discussion and Analysis of the Posttest Results for the Research Variables of the Control Group and the Experimental Group:

Table (3) Shows the means, standard deviations, T-values and the statistical significance of the results of the posttest of the control group and experimental group:

Variables	Units	Pretest		Posttest		T Value	Sig.	Significance level
		M	SD	M	SD			
T4	Ng/ml	3.98	1.35	4.73	1.12	4.73	0	Significance
Iodine	Ng/ml	174.51	15.35	189.37	22.96	7.94	0	Significance
Heart rate	Unit	73.54	3.01	75.02	2.93	2.91	0.003	Significance
Cardiac Output	3 ml	5288	409.46	5982	312.49	1.94	0.068	Non-Significance

The researchers claim that these results are due to the effects of iodine fortification, for the level of variables has enhanced, which affects the development of these athletes positively. The iodine fortification also increased the level of the T4 hormone, which increases the heart rate, and eventually boosts the cardiac output. This enhances the respiratory process and thus provides the body's systems with a sufficient amount of oxygen for a better performance. (The increase of the cardiac output results in the stimulation of the body's organs, the improvement of the muscle tone of the respiration muscles, and eventually the enhancement of the respiratory process.)

The production and effectivity of the thyroxine hormone is determined by the level of iodine within the human body, which should be about (100-150 microgram) daily. The concentration of the free thyroxine hormone (which is more effective and more used by the body's tissues) in the blood reaches about 35% of the total amount of T4 during training sessions. This is due to the fact that its speed of consumption is higher that its speed of secretion. During sport sessions, the speed of secretion increases, which paves the way for the T4 hormone to perform the metabolism process for fats, as well as it increases the size of the cardiac muscle. This meets the requirements of sport sessions which have long timespans., for it increases the concentration of the free thyroxine hormone by 25% during physical activities over 6 to 7 days. Most of its concentration is linked to the level of plasma proteins, for it causes the increase of the heart rate, and might in some cases even result in a heart rate disorder whenever it cannot cope with the individual's physiological abilities.

This leads to the conclusion that the difference between the two measurements are due to the iodine fortification, for there were significant results concerning the level of the T4 hormone, the heart rate and the cardiac output. The researchers claim that the iodine fortification lead to remarkable results which contributed effectively to the enhancement of the hormone levels whose rise leads to the increase of the heart rate and cardiac output.

CONCLUSION

According to the results of this experiment, the researchers concluded that iodine fortification has a great effect on the increase of the T4 hormone secretion, resulting in the increase of the

heart rate and cardiac output. This is reflected positively on the athlete's gas exchange as it enabled the body of transferring a sufficient amount of oxygen to the muscles.

The researchers recommend the following:

1. Iodine fortification for athletes is of great importance, as it increases their cardiac output especially for physical activities that require a great amount of oxygen;
2. A high level of thyroxine contributes to and increases the body's activity and vitality;
3. More studies should be done to observe the effect of iodine fortification on other variables like the amount of red blood cells, the level of hemoglobin, and the blood's pH level.

REFERENCES

1.Adel Majeed Khazal: The effect of a proposed training curriculum on some mineral salts and professional variables in volleyball, PhD thesis, College of Physical Education, Basra University, 2006

2.Amin Atta: The Effect of Training on Some Blood Components of Team Games Athletes, Dissertation Master, College of Physical Education, University of Basra, 1993

3. Abu Al-Ela Ahmed Abdel-Fattah: Hospitalization in the sports field, Dar Al-Kutub for printing and publishing, Cairo, 1999

4.Qassem Hassan Hussein and Abd Ali Nassif: The Science of Sports Training, 2nd edition, Mosul, Mosul University Press, 1987

5.Matveev, Sports Training Rules, translated by Qasim Hassan Hussein, Mosul University Press, 1988

6.www.Knochel1. Jp: The clinical of hypaphos Phetemia, rtnup, 2006

7.Anderson Hleden: In creased serum uric acid a marker of non gouty wid, spread pain, A study of female patients with inflammatory and non in flammatory pain, 2003

8.Berne, R. & Levy, M.: Physiology, 2nd. Ed., the C.V. Mosby Company, St. Louis, 1988.