

# The Effect of Healthy Fitness Exercises According to Indicators of Inbody Device in Some Biochemical Variables

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**Abstract:** The study included the importance of fitness and health and its use according to an InBody indicators and its effect on some biochemical variables. The importance of research lies in preparing health fitness exercises and using the indicators of (InBody) device in addition to these exercises to know its effect on dependent variables. The most important conclusion of the researcher is that healthy fitness exercises helped positively in regulating the biochemical components of the body.

**Keywords:** InBody, biochemical, health fitness, exercises

## 1. Introduction

Physical education is no longer confined today to the educational and sports sciences that are interested in training sports activities, but rather has a prominent and effective role in prevention and treatment as a result of physical and health awareness. Attention to the health aspect of the athlete and the non-athlete is considered an important aspect in the individual's life, as it represents the primary in building, developing and advancing society on sound and real bases. For humans, health is an important component of being able to accomplish daily workers without feeling tired and bored. As for healthy fitness, it is necessary for every individual, as it is part of the general fitness of the human being, and one of the components of comprehensive fitness in addition to the mental, psychological and social aspects that qualify the individual to live and in a balanced manner within society. Biochemical variables are also known as a branch of chemistry, which is concerned with the study of chemicals, chemical reactions that occur in living organisms, as well as the chemical composition of cell parts and biological processes within the body of the organism. The InBody is a device for measuring the components of the body, such as the muscles, fat, and locations of the body's fat distribution. It also gives an estimate of your daily caloric needs, your metabolism rate, and some advice on exercises that work for you. All you have to do is stand on the device, put your hands on the handles and come out with a report of the body's components. The importance of the research lies in preparing health fitness exercises and using the indicators of the (InBody) device in addition to these exercises to know their effect on some biochemical and chemical variables for women ages (30-40) because of their role in human life as it helps to avoid many diseases and health problems.

### 1.1. Research Problem

Through the experience of the researcher being a school of physical education and through watching and her interest in fitness centers and through the readings of some specialized sources in health fitness [1, 2] and the guidance of the supervisor and following the opinions of experts and specialists in this field, the researcher noted the absence of healthy fitness exercises prepared according to the indicators of modern devices such as the InBody. In addition, the InBody device is not available in most fitness centers, to help prepare exercises for the targeted areas and know the part that needs weight loss or muscle gain in it, as well as lack of attention to mechanical aspects during the training, which prompted the researcher to direct her interest in building exercises for areas that want to lose fat or increase the muscles in it. In addition to using the indicators of the InBody and the mechanical analysis because it believes that it will bring positive results through the use of mechanical analysis and how healthy fitness exercises affect the indicators of the (InBody) device in some biochemical and chemical variables for women of ages (30-40 ys).

### 1.2. Research Objectives

1. Preparing healthy fitness exercises according to InBody indicators.
2. Knowing the effect of healthy fitness exercises on some biochemical and kinematic variables for women ages (30-40 y).
3. Identify the effect difference of healthy fitness exercises on the variables between the two groups.

### 1.3. Research Hypotheses

1. There were differences between pre and posttests in the biochemical and kinematic variables of women ages (30-40 y).
2. There were differences between the two groups in the post-test in the biochemical and kinematic variables for women ages (30-40 y).

#### 1.4. Research Fields

**1.4.1. The human field:** Women between the ages of 30-40 years who participate in fitness centers in the Najaf governorate center.

**1.4.2. Temporal field:** For the period from 5/9/2019 to 1/6/2020.

**1.4.3. Spatial field:** Coral Fitness Center in the Najaf governorate.

One of the greatest causes of the spread of chronic diseases (diseases of the times) worldwide that the results of many studies have indicated is the lack of physical activity, which has led to many international institutions to reduce the risks that result from not practicing them as well as spreading a culture of physical activity that may be almost non-existent in some countries, especially developing ones [3]. The practice of physical sporting activities in daily life plays an important role in the health and illness cases, and if the individual ignores the importance of physical exercise can become a reason for the development of many diseases, and this does not mean that what is required of the individual to reach the level of the top in performance but rather that anyone should practice some of the sports activities and events that led him to enjoy a certain degree of physical fitness, as the lack of this fitness causes negative effects on the compatibility between the functions of the various organs and systems of the body, while continuing to exercise sports activities leads to a decrease in the heart rate, and blood pressure, the low level of fat, and the level of pressure experienced by the individual [1]. Many researchers in the developed world have dealt with health-related fitness issues and the impact of this on the individual's efficiency in work and production and its degree to it in society [4]. The concept of physical fitness is closely related to health, which is a typical condition of the functional advancement of the body and all its systems, which contributes to a person living efficiently and effectively, which is more than just being free of diseases in the body [3].

#### 1.5. Biochemistry

It is one of the branches of the natural sciences and specializes in studying the chemical composition of cell parts in various organisms, whether they are microorganisms such as (bacteria, fungi, algae or humans, animals, and plants) [5]. Biochemistry is sometimes described as the science of life chemistry, due to the link between biochemistry and life. Scientists in this field have focused on researching the chemistry of living organisms of different types by studying the cellular components of these organisms in terms of the chemical structures of these components and their areas of presence and vital functions as well as study the various biological reactions that occur within these living cells in terms of building and synthesis, or in terms of demolition and energy production [6]. Biochemistry is closely related to molecular biology, which is the study of the molecular mechanisms by which genetic information in the DNA is coded in biological processes and depending on the precise identification of the terms used, molecular biology can be considered as a branch of biochemistry, or biochemistry as a tool to investigate and study molecular biology. Biochemistry largely deals with the structure, function, and interactions between cell components such as fats, carbohydrates, proteins, nucleic acids, and other biomolecules. Some of these molecules are large and complex and are called biopolymers. These consist of similar and repeating units each one called monomer. Each biopolymer molecule contains different groups of units, for example a protein is a polymer whose units consist of a different group of 20 amino acids or more [7]. Biochemistry studies the chemical properties of important biomolecules such as proteins, especially reactions that stimulate by enzymes [6]. One of the prominent features of the cell is its ability to perform reactions quickly and with the temperature of the surrounding medium. It is similar to its complexity and its interdependence is a complex autonomous machine and cannot exist and operate except in certain functional conditions. Enzymes are regulated substances; most biochemical reactions are stimulated by enzymes. These enzymes cause increased speed and rates of reactions. The cells regulate the rates of chemical reactions by enzymes. The enzymes are proteins that are built inside the cell and act as biocatalysts to accelerate the rate of velocity of life reactions without being lost or degraded in reaction and without any change in its chemical composition [8]. Biochemistry related to metabolic processes within the cell and related to the endocrine system has been extensively studied. Other areas of biochemistry include genetic material (DNA, RNA), transfer of materials through the cell membrane, and signal transmission. Chemistry results are used in medicine, nutrition, and agriculture. In medicine, biochemists study the causes and treatment of diseases. In the field of nutrition, they study how to maintain health and wellness and study the effects of undernutrition or what is known as malnutrition. In the field of agriculture, biochemists are investigating soil and fertilizers, and are trying to find ways to improve crop cultivation, crop storage and pest control [9].

#### 1.6. InBody Device

It is a device for measuring the components of the body, such as muscles, fats, and places for distributing body fat. It also gives an estimate of your daily caloric needs and metabolic rate. InBody testing provides a comprehensive view of the balance of body composition. Body water, proteins, minerals and body fat, which are components of the human body, are closely related to our health condition. Using the quantitative analysis method, these elements provide the basic information needed to assess the

condition of the body [10]. InBody uses the Bio-Electrical Impedance Analysis technique, which relies on measuring the body's resistance to a tiny electric current passing through various paths in the body and then calculating the potential difference on it. It measures the total amount of water in the body, then the amount of fat and body weight without fat and measures the different body components [11]. Figure 1 shows the InBody used in the Coral fitness center.



**Figure 1** InBody used at the Coral fitness center

## 2. Research Methodology and Field Procedures

The nature of the problem studied is what determines the nature of the curriculum, so the researcher used the experimental approach, which is "the closest and most honest to solve many scientific problems in practice and theory. The research community included participants in the coral fitness club, which numbered (93), and (20) were randomly selected, then they were divided into two control and experimental groups.

### **The following biochemical changes were identified:**

First - Body Composition Analysis

1. Total Body Water
2. Protein
3. Minerals
4. Minerals
5. Weight

Second - Muscle-Fat Analysis

1. Weight
2. Skeletal Muscle Mass
3. Body Fat Mass

Third - Obesity Analysis

1. Body Mass Index
2. Percent Body Fat

Fourth - Analysis of Muscle Parts

Fifth - Analysis of Fatty Parts

The researcher conducted an exploratory experiment with the assistance of the assistant work team on 5 individuals from the research community, and the experiment was carried out within one day, during which physical tests were performed, as well as measurements of physical components using the InBody, on (29/9/2019) and the aim of the experiment as following:

- Verify the validity of the devices and tools used.
- Know the obstacles that appear and avoid errors and overlaps in work.

- Knowing the time required to perform measurements and tests for each individual.
- Find out what mistakes are in this experiment to avoid in the final experiment.
- Knowing the fitness level of the research sample

The researcher performed the tribal measurements in all research variables (weight - length - body components - physical efficiency) on 12/8/2019 for all members of the research sample. The measurements will be made at the Coral fitness center in Najaf, supervised by the following procedures:

First: Attending the research sample in the fitness room

- Test the search sample with the (InBody) device one by one and at rest time before applying the programs.
- After the research sample is tested, the test samples will be collected in the information dump form.

Second: Measuring height and weight to extract fat percentage and body mass index.

Third: After completing these procedures, the data forms are collected to be processed in order to obtain the results related to this research sample after completing the pre-test and then the programs that will be determined later. Post-test and measurements were conducted after the completion of the implementation of the approved programs in the research, within one day, as it was done on (1/3/2020) and until (2/3/2020) in the same sequence of tests and tribal measurements.

### 3. Statistical Methods

1. SPSS
2. Mean
3. Standard Deviation (SD)
4. T-test

Depending on the results we collected, it was found that the experimental sample achieved significant differences in some variables for pre- and post-test (Table 1).

**Table 1:** Results of the statistical comparisons of the research variables of the two groups in the post-test

Indicators	Unit	Experimental Group		Control Group		T-test	Sig.	Statistical Results
		Mean	SD	Mean	SD			
The percentage of water in the body	Liter	33.08	3.71	36.31	3.11	0.439	0.629	No Statistical Sig.
Protein	kg	11.60	1.17	10.03	0.96	3.274	0.004	Statistical Sig.
The mass of fat in the body	kg	22.26	2.33	24.25	1.58	2.231	0.039	Statistical Sig.
Weight	kg	66.41	3.2	64.7	0.88	2.730	0.014	Statistical Sig.
Muscle Mass	kg	29.60	2.75	26.90	2.09	2.464	0.024	Statistical Sig.
Body Mass Index Appended	kg/cm <sup>2</sup>	22.42	2.83	25.10	0.74	2.30	0.033	Statistical Sig.
Metabolic Rate	Calories	1701.80	287.67	1510.50	53.88	2.441	0.025	Statistical Sig.
Minerals	kg	3.50	0.97	3.12	0.35	1.138	0.270	No Statistical Sig.
Degree of obesity	%	117.70	2.86	123.20	7.53	2.156	0.045	Statistical Sig.
Axis of shoulders	Degree	2.20	1.13	3.50	1.17	2.512	0.022	Statistical Sig.

Concavity of the sacral lumbar region	Degree	44.80	3.55	48.10	1.91	2.587	0.019	Statistical Sig.
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It turns out that the experimental research sample achieved mathematical mean in the variable of water ratio in the body 33.08 and a standard deviation of 3.71 in the post-test measurement. As for the protein variant in the body, the sample achieved an average mean of 11.60 and a standard deviation of 1.17 in the post-test measurement. As for the variable of the fat mass in the body, the sample achieved an average mean of 22.26 and a standard deviation of 2.33 in the post-test measurement. As for the weight variable, the sample achieved an average mean of 66.41 and a standard deviation of 3.2 in the post-test measurement. As for the muscle mass variable, the sample achieved an average mean of 29.60 and a standard deviation of 2.75 in the post-test measurement. As for the attached BMI variable, the sample achieved a mean of 22.42 and a standard deviation of 2.83 in the post-test measurement. As for the metabolic rate variable, the sample achieved a mean of 1701.80 and a standard deviation of 287.67 in the post-test measurement. As for the variable of metals, the sample achieved a mean of 3.50 and a standard deviation of 0.97 in the post-test measurement, either in the obesity degree variable, the sample achieved an average mean of 117.70 and a standard deviation of 2.86 in the post-test measurement. As for the variable of the axis of the shoulders, the sample achieved a mean of 2.20 and a standard deviation of 1.13 in the post-test measurement, whereas in the concavity variable for the lumbar region, the sample achieved a mean 44.80 and a standard deviation of 3.55 in the post-test measurement. As for the control sample, it achieved a mean of 36.31 and a standard deviation of 3.11 in the post-test measurement, whereas in the protein variable in the body, the sample achieved a mean 10.03 and a standard deviation of 0.96. In the post-test measurement, as for the variable of the fat mass in the body, the sample achieved an arithmetic mean of 24.25 and a standard deviation of 1.58 in the post-test measurement, but in the variable of weight the sample has a mean of 64.7 and a standard deviation of 0.88 in the post-test measurement. As for the muscle mass variable, the sample achieved an average mean of 26.90 and a standard deviation of 2.09 in the post-test measurement, either in the appended body mass index variable The sample achieved an arithmetic mean of 25.10 and a standard deviation of 0.74 in the post-test measurement. As for the metabolic rate variable, the sample achieved an arithmetic mean of 1510.50 and a standard deviation of 53.88 in the post-test measurement. As for the variable of minerals, it has mean of 3.12 and a standard deviation of 0.35 in the post-test measurement. As for the obesity degree variable, the sample achieved a mean of 123.20 and a standard deviation of 7.53 in the post-test measurement. As for the variable of the shoulder axis, the sample achieved a mean of 3.50 and a standard deviation of 1.17 in the post-test measurement. As for the concavity variable for the sacral lumbar region, the sample achieved an arithmetic mean of 48.10 and a standard deviation of 1.91 in the post-test measurement. The researcher used the statistical relationship T-test to extract the results of the statistical comparisons of the two groups in the post-test. As the value of (T) calculated for the percentage of water in the body was about of 0.439, the value of (T) calculated for the proportion of protein (3.274), as well as the value of (T) calculated for the fat mass in the body (2.231) and the value of (T) calculated for the total weight (2.730). The value of (T) calculated for the muscle mass was (2.464), the calculated value (T) for the attached BMI was about of 2.30, the calculated value (T) for the metabolic rate was (2.441), and the calculated value (T) for the ratio of minerals In the body (1.138), the value of (T) calculated for the degree of obesity (2.156), the value of (T) calculated for the axis of the shoulders (2.512), and the value of (T) calculated the concavity of the sacral lumbar region the axis of the shoulders (2.512), and the calculated value (T) of concavity of the sacral lumbar region (2.587). Which indicates the existence of significant differences between the experimental and control groups between the pre and posttest and in favor of the posttest in the variables under study (protein, body fat mass, weight, muscle mass, body mass index, metabolic rate, shoulders axis, degree of obesity, concavity of the sacral lumbar region, because the calculated value of (T) is less than the significance level of (0.05). This means higher physical efficiency when measuring post. The lack of significance of the values of the water ratio of the body and the percentage of minerals because these values often remain within the natural limits. Through the results of the research variables that were presented in **Tables 1**. We notice a statistical difference in the pre-post-test for the two groups and in favor of the post-test and the reason for the difference is that the system prepared by the researcher is more positive at the level of physical efficiency and body components. These results are due to the extent of the effect of the mathematical system that was applied on some people of the research sample, and this is evident by improving the percentage of muscle mass. As the percentage of improvement in healthy fitness exercises prepared by the researcher reached (0.039), and by a percentage of 0.019 in the athletic system followed by the center. The researcher believes that the percentage of muscle mass has increased for the people of the experimental group. Healthy fitness exercises prepared by the researcher is the most positive and the best rate of improvement, followed by the sports system followed by the center. As the exercises supervised by the researcher during the period of the experiment focused on the weak muscles represented by the muscles of the legs, arms and trunk and the exercises helped to improve the muscle strength, as more focus must be placed on strengthening the weak areas in light of these exercises, and the exercises reflected a positive reflection on improving the muscle strength during the performance of the mathematical system followed by the experimental group and this led to an improvement in the muscle strength of the sample. It is clear from the above that healthy fitness exercises had a significant impact on the physical composition of the research sample, which led to melting fat through calories burned by the body through this physical exercise and this effectively affects the ratio of both the fat component and the muscular component. This is confirmed by

Bastawisi that the physical exercise causes changes in the physical components of the individual, as the physical loads and efforts lead to functional and formative adaptation and to noticeable external changes [12]. The organized practice of athletic activity for long periods of time earns its practitioners some physical measurements, and that the change in these measurements it is due to the nature of the muscle groups most used in that activity, that is, the muscle fibers begin to swell and grow, which affects the oceans, symptoms and folds of the skin [13]. These results are consistent with the studies carried out by Al-Hindawi and Al-Sharia [14] and Al-Saidi [15], and Westcott [16], as these studies have proven the effectiveness of resistance training in improving body shape and the positive effect on body components, and these results have found that resistance training increases muscle tissue and increases fat-free mass as well as leads to low blood lipids in the body, due to the fact that resistance training reduces fat, increases muscle tissue and increases basal representation, which leads to increased energy consumption. Where Nour El-Din [17] emphasizes that practicing any kind of different sporting activities regularly and for long periods gives its practitioners special morphological specifications. Mufti Ibrahim showed that the relative relationship of fats to other components of the body constitutes an important axis in the concept of body composition, given the association of fats with many health problems. If a person is overweight or too thin, then this may put him in trouble healthy [5]. Elham and Amal are indicated that the percentage of fat and muscle tissue has a close relationship with fitness components, where each affects the other, for example, the increase in fat negatively affects the aerobic and anaerobic capabilities, flexibility, and the increase in muscle tissue positively affects the strength component muscular endurance [18].

#### 4. Conclusions

1. Healthy fitness exercises helped positively to regulate the biochemical components of the body.
2. Healthy fitness exercises had a great role in improving the sample strength.

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