**A Healthy Nutritional Relationship with the Total Energy of Tabata Exercises**

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**Abstract:** The research aims to identify the most important nutritional establishing a healthy nutritional relationship with tabata exercises involves understanding the energy demands of this High-Intensity Interval Training (HIIT) regimen and fueling your body appropriately to support performance, recovery, and overall health, as well as treating some of the negative effects of practicing sports activities, which may cause many diseases that reduce the physical efficiency and nutritional health of athletes.

**Keywords**: nutritional supplements, athletes, energy, healthy nutrition.

**Introduction**

The science that investigates the connection between diet and health is called nutrition. This entails analyzing the nutrients required by the body for life, growth, and development in addition to how the body absorbs and uses these nutrients for different purposes [1]. The significance of nutrition in sustaining general health and preventing illness. It is essential for body development and growth. For the body to grow cells, tissues, and organs, it needs nutrients.

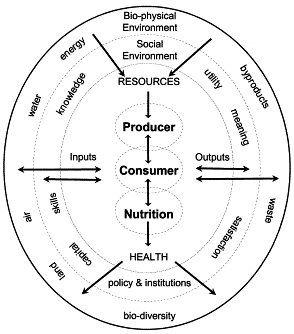
Maintaining vital functions: For the body to carry out necessary processes, including breathing, digestion, circulation, and nervous system function, it needs nutrients.

Disease prevention: Good nutrition and a nutritious diet can help stave off heart disease, diabetes, and cancer, among other ailments.

The components of food that the body needs for survival are called nutrients. growth and development[2].

The concept of “food and nutrition system” is used here instead of simply “food system” to emphasize and focus on the vital links between food production, food consumption, and nutritional health. Food fulfills a variety of functions, such as giving pleasure, supporting oneself, upholding social customs, and giving nourishment. [3] All of these goals, excluding nourishment, for which food is the only source, could be accomplished in other ways. Food production and consumption would not occur on the current scale or receive the current level of attention if it were not for the biological requirement to provide nutrients and energy to maintain health and prevent disease. Therefore, the food and nutrition system must take into account the physiological requirements for consuming enough nutrients and avoiding harmful toxicants.

Although the phrase "food system" is widely used, the idea of a system is frequently applied haphazardly and is unrelated to systems theory, despite the latter's incorporation in farming and agricultural systems as well as ecological energy analysis [4]. Through integrative thinking, systems theory aims to prevent disciplinary compartmentalization.



Food and nutrition system [5].

**There are four main types of nutrients** [1]:

1. Proteins:

• Play a crucial role in building and maintaining tissues in the body.

• Composed of chains of amino acids.

2. Carbohydrates:

• It is considered a primary source of energy for the body.

•including sugars, starches, and dietary fibers.

3. Fats:

• Provide stored energy for the body.

• Include saturated fats, unsaturated fats, and polyunsaturated fats.

4. Vitamins:

• Act as a helper in vital processes in the body.

• Divided into fat-soluble vitamins (A, D, E, and K) and water-soluble vitamins (B-complex, C).

5. Minerals:

• Play a vital role in various body functions, such as bone building and oxygen transport.

• Include calcium, iron, zinc, magnesium, potassium, and others.

• Caloric content in nutrients:

1. Proteins: Provide approximately 4 calories per gram.

2. Carbohydrates: Provide about 4 calories per gram. The diet should emphasize healthy carbohydrate sources like whole grains, vegetables, and fruits.

3. Fats: Provide about 9 calories per gram. It is essential to choose the type of fats consumed, favouring healthy unsaturated fats.

4. Fiber: Does not contain calories as it doesn't digest in the stomach but plays a crucial role in supporting digestion and promoting a feeling of fullness.

**Methods for reviewing existing models**

This investigation conducted a literature review, requested information, and collected data regarding current models and conceptualizations of food and nutrition systems.

**Concept of Tabata Training**

Tabata training is a type of cardiovascular and aerobic exercise that is relatively new, gaining popularity after 1990. Discovered by Dr. Izumi Tabata in that year, these exercises were named after him. Dr. Izumi Tabata, at the time, was researching a new method to strengthen and enhance the energy of the Japanese Olympic skiing team. His focus was on finding exercises to push the body to exert maximum effort, pushing muscles to their limits without external weights, and relying on internal body effort and energy. The objective of this approach is to recharge the body with substantial and prolonged energy after completing the exercise. Although intensive efforts can reach this stage, they may cause health risks, such as muscle growth, as well as different muscular injuries. Thus, Dr. Izumi Tabata created a set of aerobic exercises that everyone may do, along with the ideal amount of time the body should be able to tolerate each activity [6]. Importance of tabata Training

Tabata exercises are characterized by their high and short durations. These exercises involve performing specific exercises for 20 seconds, followed by a 10-second rest, repeated for a total of 8 rounds, amounting to 4 minutes [6].

Tabata exercises offer several benefits, including:

• Fat Burning Assistance: tabata exercises effectively contribute to fat burning as they compel the body to utilize energy from fat stores rather than carbohydrates.

* Tabata exercises improve physical fitness by strengthening the heart, blood vessels, and muscles.

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• Ease of Performance: Tabata exercises require no special equipment or dedicated space, and they do not consume much time.

Therefore, tabata exercises are considered one of the best fitness methods for individuals seeking fat-burning and improved physical fitness without requiring extensive time or effort [6].

The exercise is performed as follows:

1. Start with a standing position, feet shoulder-width apart.

2. Lower your body by bending your knees until your thighs touch the ground.

3. Raise your body back to the standing position.

Repeat this exercise for 20 seconds, then take a 10-second rest. Repeat for 8 rounds, totaling 4 minutes. You can choose any exercise for tabata training, but it's advisable to select exercises targeting all major muscle groups [6].

The Methods of Whey Separation:

There are several methods for separating whey protein from other components in milk.

It depends on the technology used and the available equipment. Here are some common methods for whey protein separation [7]:

1. Utilizes a membrane filtration system to separate whey protein from other components. A semi-permeable membrane is used to determine particle size, differentiating whey protein from other components.

2. Ultrafiltration:

Relies on a membrane that allows the passing of whey protein particles and retains larger particles. This method is effective in obtaining high-quality whey protein.

3. Heat and Filtration:

Involves heating milk to eliminate some undesirable components.

[7].

4. Acid Precipitation:

Natural acids like lactic acid can be used to precipitate whey protein. After adding the acid, a protein mass forms, which can be separated from other components.

5. Enzymatic Precipitation:

Some enzymes are used to induce the precipitation of whey protein. This method is employed in certain cases of cheese production.

6. Size Exclusion:

Relies on the use of tubes containing size-specific materials that prevent the passage of whey protein. Protein separation is based on particle size.

7. Solvent Extraction:

Certain solvents can be used to extract whey protein. The solvent evaporates to obtain pure whey protein.

**Benefits of Whey Protein:** [8]

1. Muscle Building: Aids in building and preserving muscles, especially effective post-exercise.

2. Weight Loss: This can contribute to weight loss by promoting satiety and boosting metabolism.

3. Heart Health: improve heart health by reducing harmful cholesterol levels and blood pressure.

4. Immune System Support: Helps enhance the immune system by increasing white blood cell production.

the components of whey protein according to [9].

1. Protein: consists of protein and can be as high as 90% or more of the supplement's weight.

2. Amino Acids: It contains all essential and non-essential amino acids, serving as the fundamental building blocks for protein.

3. Lactoferrin: Considered an important component, it enhances antibacterial and antiviral effects, with efficacy in stimulating the immune system.

4. Globulin: It comprises a group of important proteins like immunoglobulins and enzymes that play a role in supporting the immune system.

5. Albumin: is anothertype of protein contributing to the provision of essential amino acids.

6. Phospholipids: Whey protein contains phospholipids, which play a role in digestion and fat absorption.

7. Minerals and Vitamins: Whey protein may contain small amounts of minerals such as calcium, iron, and zinc, along with some vitamins.

Whey protein is available in various forms, including powder, dietary supplements, and food products. It can be used in a variety of dishes, such as juices, snacks, and baked goods [10]. Protein-rich foods are highly valued by consumers seeking satiety or muscle mass increase. Traditionally, the industry relied on dairy and soybean components, with protein content ranging from 20% to 50% (weight/weight) in these foods [10].

Nutrition bars enriched with protein have been used as a new protein source, representing a simple and nutrient-rich dietary supplement relying on carbohydrates, proteins, fibers, and health-enhancing substances such as antioxidants – reflecting the current trend in the food sector [7].

Studies indicate that protein-rich nutrition bars, originally developed for athletes, currently attract a wide range of health-conscious consumers [11].

Relationship of Nutrition Bars with Weight Loss

Protein-enriched nutrition bars made from whey protein offer several potential benefits for bodybuilders, including:

- Assisting in Satiety: Whey protein nutrition bars can help maintain a feeling of fullness for a longer duration, potentially aiding in consuming fewer calories.

- Muscle Building: These bars can contribute to muscle building and preservation, especially when consumed post-exercise.

- Improving Sports Performance: Whey protein nutrition bars may enhance athletic performance by supplying the body with the necessary protein for repair and growth.

For weight loss, protein-enriched nutrition bars made from whey protein can help in several ways:

- Reducing Caloric Intake: These bars can contribute to reducing overall calorie intake by providing a concentrated protein source.

- Increasing Satiety: Whey protein nutrition bars may increase the feeling of fullness, helping to consume fewer calories in other meals.

- Enhancing Metabolism: These bars may improve metabolism, potentially aiding in burning more calories.

**The Relationship Between Tabata Training and Weight Loss**

Tabata workouts, characterized by high-intensity cardio exercises for short periods, offer various benefits, including effective fat-burning and improved fitness. For bodybuilders, Tabata training can be beneficial for weight loss, especially when integrated into a comprehensive training plan [12].

Benefits of Tabata Training for Weight Loss in Bodybuilders [13]:

• Efficient Fat Burning: Studies suggest that tabata workouts can help burn up to 15% more calories compared to other forms of exercise. This indicates that bodybuilders incorporating Tabata can burn more calories in less time, aiding in weight loss.

• Increased Metabolism: Tabata training leads to a post-exercise boost in metabolism, helping burn additional calories even during rest. This means bodybuilders engaging in Tabata can burn more calories in the long run. [13].

• Muscle Mass Enhancement: Muscle mass contributes to continuous calorie burning, even at rest, aiding bodybuilders in long-term weight loss.

Integrating Tabata Training into Bodybuilders' Workout Plans Bodybuilders can incorporate Tabata training into their workout plans in several ways:

1. First Method: They can integrate tabata exercises as part of their regular cardio workouts. For example, engaging in 20 minutes of tabata training after a strength training session.

2. Second Method: Tabata exercises can be included as part of their resistance training. For instance, practice 20-minute tabata sessions between sets of strength training.

3. Third Method: They have the option to include tabata training as part of their steady-state workouts. For example, performing 20-minute tabata workouts every day or every other day.

Recommendations for practicing tabata training for bodybuilders:

Here are some examples of tabata exercises that bodybuilders can incorporate: [6]

**Side Effects of Tabata Training**

Tabata training offers numerous health benefits, including effective fat-burning and improved fitness. However, there are potential side effects of tabata training, which include

- Fatigue: Tabata training can cause fatigue, especially for beginners. If you experience tiredness or dizziness during exercise, stop immediately.

- Injury: Tabata training may increase the risk of injury, especially if you're not accustomed to regular physical activity. Consult your doctor before engaging in tabata training if you have any existing injuries.

- Stomach Issues: Tabata training can lead to stomach problems like nausea and vomiting. If you experience stomach issues, consume a light, healthy meal before exercising.

Tips to Reduce tabata training side effects [12]:

- Start Slow: If you're a beginner, start with a few rounds of tabata exercises and gradually increase the number of rounds.

- Get Adequate Rest: Ensure you get enough rest between workout sessions.

- Hydrate Well: Drink plenty of water before, during, and after exercise.

**Side Effects of Whey Protein [13]:**

Whey protein and tabata training: benefits and side effects

Whey protein is a quickly digestible protein type it is naturally found in milk. It is produced by separating whey protein from casein protein, another milk protein.

Whey protein offers various health benefits, including muscle building, preservation, and enhanced athletic performance. However, potential side effects exist.

- Digestive Issues: Whey protein may cause digestive problems such as nausea, vomiting, and diarrhea. If you are suffering from digestive issues, consider consuming whey protein in smaller quantities.

- Allergies: Whey can trigger allergies, especially in individuals allergic to dairy products due to lactose intolerance. If you have dairy allergies, consult your doctor before using whey.

- Health Complications: Consuming large amounts of whey may lead to health complications, including an increased risk of kidney stones due to elevated mineral salts, especially calcium and heart disease. It's crucial to follow recommended dietary guidelines when consuming whey.

Tips to Reduce Whey Protein Side Effects [13]:

- Start with Small Quantities: If you're new to whey protein, begin with small amounts and gradually increase the quantity.

- Choose High-Quality Whey Protein: Opt for high-quality whey protein from a reliable source.

- Stay Hydrated: Drink plenty of water with whey protein to aid absorption.

In general, Tabata training and whey protein can be beneficial for health, but it's important to be aware of potential side effects before starting to use them.

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