

# The Influence of the Ketogenic Diet on Jump Height in D1 Collegiate Volleyball Athletes

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## Abstract

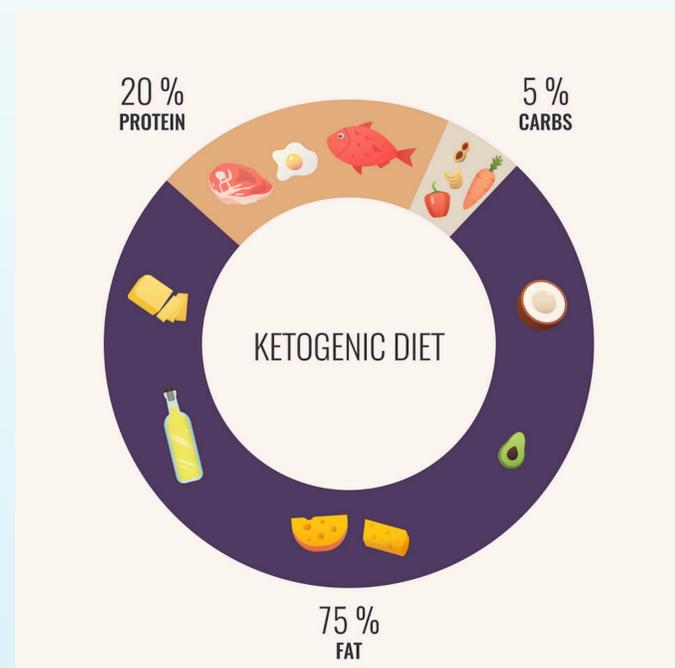
**PURPOSE:** The ketogenic diet was originally created in 1911 in hopes of treating epileptic children. Now, the ketogenic is a cultural trend that many stationary individuals use but has seldomly been studied regarding athletes and their performance. The purpose of this study was to examine the effects of the ketogenic diet and its direct effects on power through testing jump height in volleyball players. **HYPOTHESIS:** It was hypothesized that the ketogenic diet will have an overall negative effect on the performance of an athlete specifically in jump height in collegiate volleyball players. **METHODS:** Participants included twenty apparently healthy, female collegiate volleyball players who volunteered for this study. At the start of week one, the first testing session was conducted to gather participants pre-diet measurements. Weeks 1-4 were dedicated to the ketogenic diet and continuing typical training protocols. The end of week 4 was dedicated to post-diet testing. Weeks 4-8 was dedicated to resuming typical personal diets as well as training. End of week 8 was dedicated to gathering final measurements, post one month of resuming a normal diet. **LIMITATIONS:** These may include the small sample size that was chosen from the Gardner-Webb female volleyball team. As well as the little amount of time for the ketogenic to properly take into effect.

## Introduction

- Nutrition
  - Broken down into six categories including: carbohydrates, fats, proteins, vitamins, minerals, and water. <sup>3</sup>
  - These nutrients provide two main functions including:
    - Providing the body's metabolism rate
    - Promote growth and development
- Ketogenic Diet
  - This diet removes most carbohydrates from daily food intake, making fats and protein a priority nutrient instead of carbohydrates.
  - The ketogenic diet is essentially starving the body of carbohydrates so the body will utilize protein storage to make glycogen which will aid in the lose of body fat. <sup>1</sup>
- Anerobic and Aerobic Exercise
  - Volleyball is considered anerobic exercise and requires large amounts of carbohydrates to store energy for power and performance.
- Due to the human body utilizing carbohydrates as it's main fuel source, the lack of carbohydrates due to the ketogenic diet causes the body to take from other fuel sources the body has such as proteins or fats.
- Due to the lack of carbohydrates, the body must rely on glycogen causing the body to have a lack of energy and decreased power performance. <sup>1</sup>

## Methodology

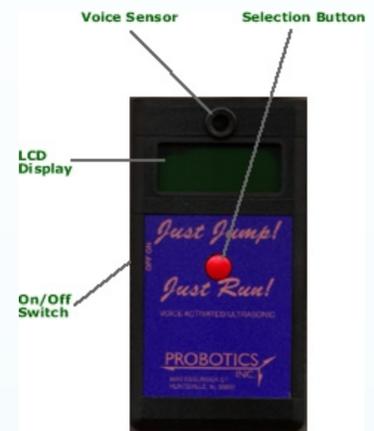
- Week 1**
  - Prescreening & Pre-diet testing
  - Measurements for height, weight and percentage of body fat recorded
  - Individual scores of jump height through Just Jump Mat were recorded
  - Vertical jump trialed three times with 30 seconds breaks in between each trial
- Week 1-4**
  - Completed the ketogenic diet
  - 75% fat, 20% protein, and 5% carbs
  - Participant was consistent with diet with no breaks
  - Continued typical training routine
- Week 4**
  - Post-diet testing
  - Measurements for height, weight and percentage of body fat recorded once again
  - Individuals scores of jump height were recorded for post-diet measurements
- Week 4-8**
  - Typical Individual Diet Resumed
  - Each participant stopped the ketogenic diet and continued their personal diet's
- Week 8**
  - Final Testing Completed
  - Measurements for height, weight and percentage of body fat recorded for the final time
  - Participants completed the last session of three trials of vertical jump using the just jump mat



<https://www.vectorstock.com/royalty-free-vector/ketogenic-diet-diagram-vector-23397120>



[https://www.performbetter.com/Just-Jump-System\\_2](https://www.performbetter.com/Just-Jump-System_2)



[https://www.lifestylesport.com/Just\\_Jump\\_System\\_p/jjs.htm](https://www.lifestylesport.com/Just_Jump_System_p/jjs.htm)

## Operational Definitions

**Ketogenic Diet:** Diet where the body is depleted of carbohydrates, specifically, 75% fats, 20% protein, 5% carbohydrates

**Vertical Jump:** the act of jumping upwards into the air to test endurance and strength

**Anerobic Exercise:** exercise that breaks down glucose in the body with no oxygen and largely depends on ATP for energy transfers

**Aerobic Exercise:** exercise that requires oxygen to work large muscles

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## References

1. Masood, W., Annamaraju, P., & Uppaluri, K. (2021). Ketogenic diet.
2. McArdle, W., Katch, F., & Katch, V. (2015). Exercise physiology: Nutrition, energy, and human performance. Wolters Kluwer Health/Lippincott Williams & Wilkins.
3. Williams, M., (2009). Nutrition: for Health, Fitness, & Sport. McGraw Hill.