

Dietary Adequacy of College Athletes and Relationship with VO₂ max

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Introduction

College athletes spend about 20 hours per week training for their sport.¹ All that training requires lots of fuel to keep them at the top of their game.² However, many college athletes are not meeting minimum nutrition requirements.^{3,4} Failure to meet minimum nutritional requirements may not only effect performance, but also could have serious health implications, such as: menstrual dysfunction in females, hypogonadotropic hypogonadism in males and low bone mineral density in both sexes.⁵

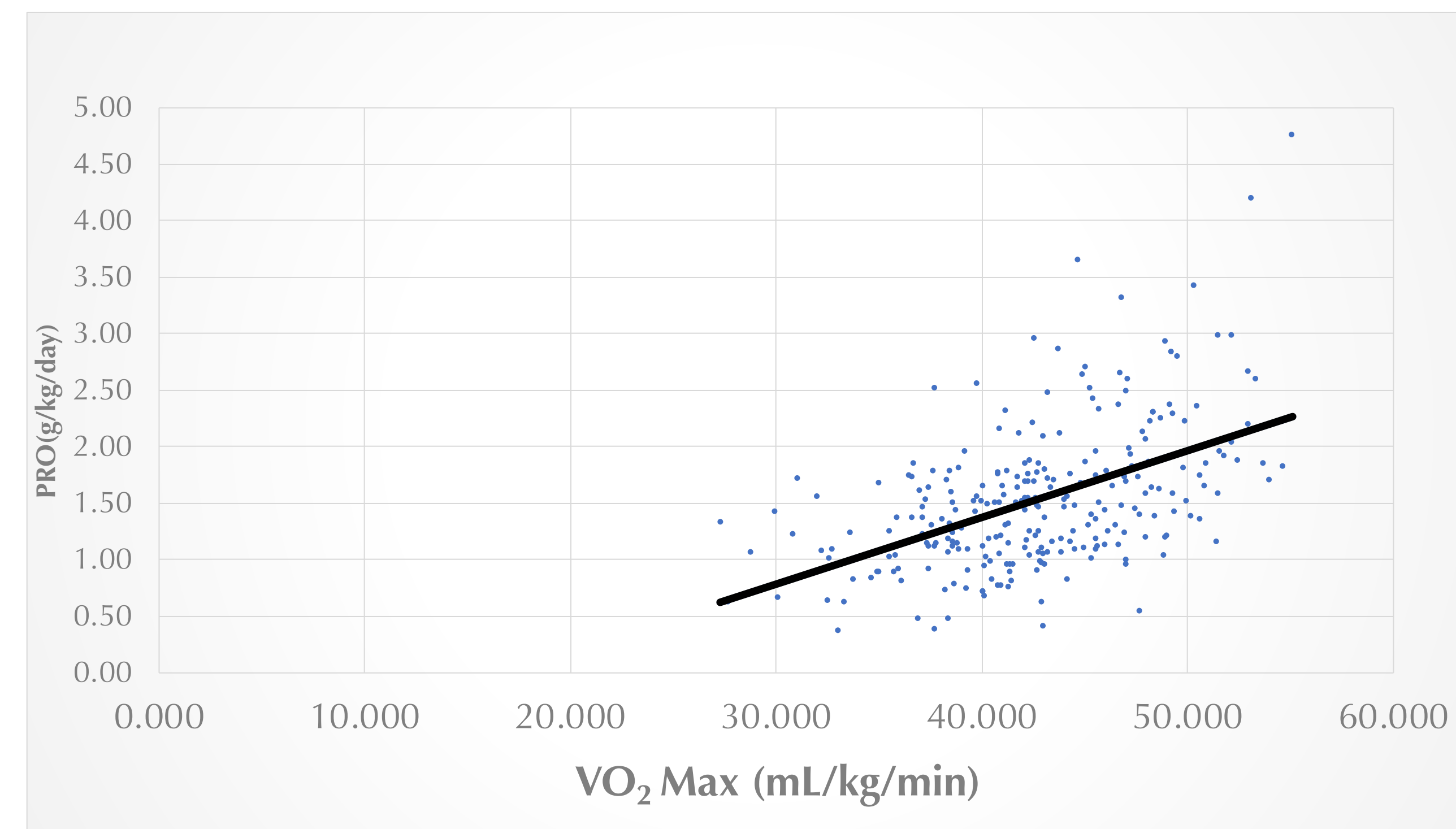
What are the nutritional requirements?

According to Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine, athletes should be consuming approximately 5g/kg/day of carbohydrate (CHO) and 1.2g/kg/day of protein (PRO) to meet needs.² Burke et al. confirms this CHO recommendation, and states that males tend to meet this requirement; however, females do not.⁴ Shriver et al. confirms these protein requirements, and reports that most female athletes did meet the requirement.³

What is VO₂ Max?

VO₂ Max is a calculated measure of physical fitness. Kline et al. wanted to discover a way to measure this from a one-mile walking test. Their testing resulted in a basic formula to calculate VO₂ Max but was only validated for 30-69-year-old adults.⁶ Dolgener et al. replicated this study in college students and found a validated formula for this population. The only variables needed to calculate VO₂ max with the Dolgener formula are gender, weight, finishing time and 60 second heart rate.⁷

VO₂ Max Compared to Protein Intake

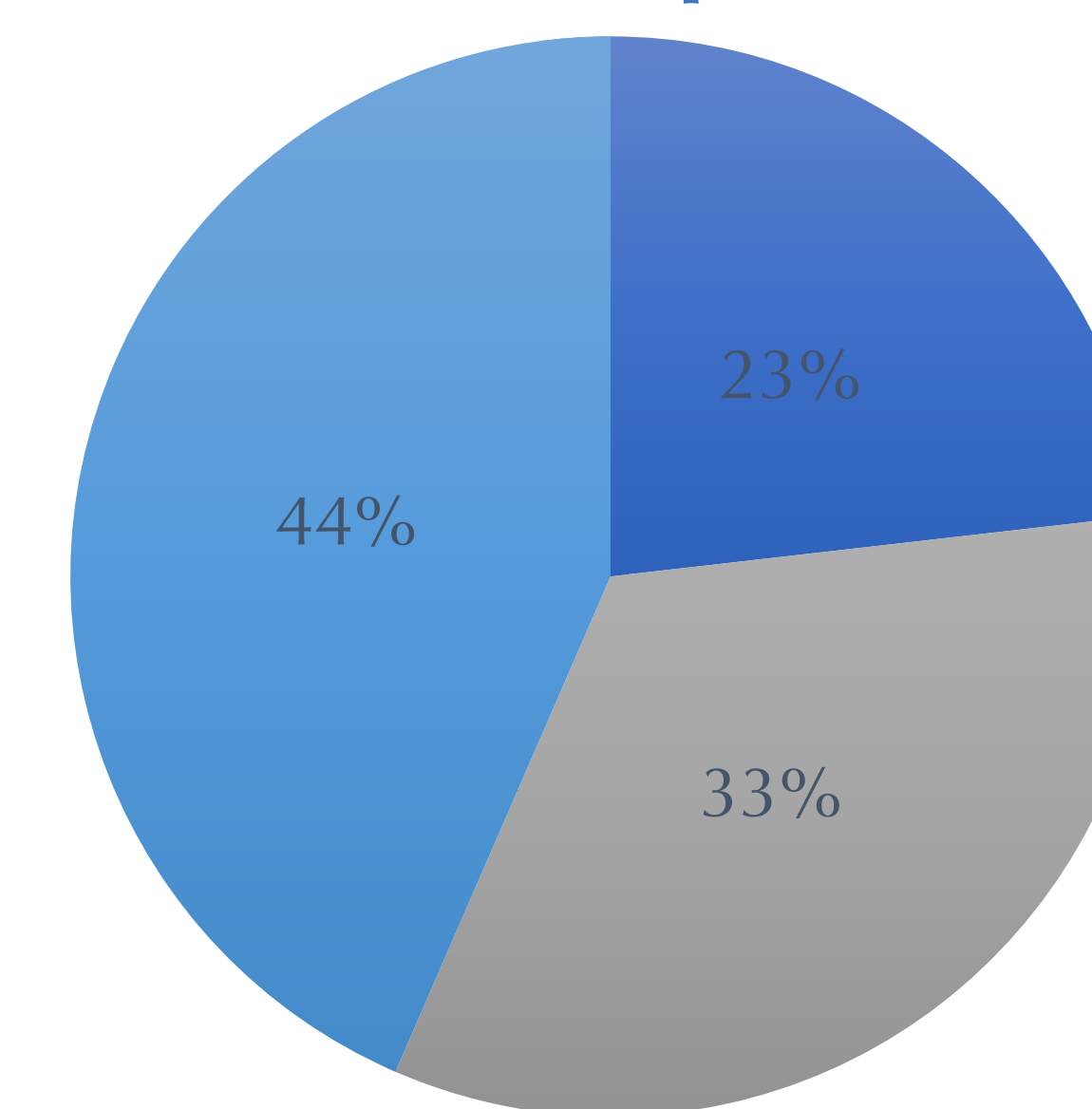


Subject Characteristics of College Athletes

	Male n=97	Female n=179	All n=276	p value
Age (Years)	19.31±1.38	18.69±.982	18.91±1.17	<0.001
Height (cm)	177.86±7.51	165.57± 7.94	169.89±9.75	<0.001
Weight (kg)	77.15±14.56	63.33±11.63	68.19±14.33	<0.001
BMI (kg/m ²)	24.29±3.56	23.04±3.35	23.48±3.47	<0.001
Academic Year				
Freshman (%)	39.2	57.5	51	
Sophomore (%)	38.1	30.7	33	
Junior (%)	17.5	6.7	11	
Senior (%)	4.1	5	4.7	
Other(%)	1	0	0.4	
Semester				
Fall (%)	81.4	77.7	79	
Spring (%)	18.6	22.3	31	

Continuous variables are presented as mean ± Standard error

Carbohydrate and Protein Intake Groups



- Adequate or High PRO and CHO
- Inadequate PRO & CHO
- Inadequate PRO or CHO

Methods

Data were collected between 2015-18 as part of the College Health and Nutrition Assessment Survey (CHANAS) at The University of New Hampshire (UNH-IRB 5524). This study is an ongoing cross-sectional study.

Participants

All subjects in this analysis (n=276) were self-identified student athletes enrolled in Nutrition in Health & Well Being (NUTR 400) at UNH. The selected sample was 18-24 years of age, not pregnant, and did not have any medical restrictions.

VO₂ Max Collection and Calculation

VO₂ Max, a measure of aerobic fitness, was estimated via a validated 1-mile Rockport Fitness Test. All data collected were calculated with the validated Dolgener et al. equation of estimated VO₂ Max.

Diet Collection and Categorization

CHO & PRO intake was determined from 3-day food records and nutrient analysis software (Diet & Wellness+). Participants were then categorized into three categories based on intake. Adequate intake was based on 5g/kg/day of CHO and 1.2 g/kg/day of PRO per Academy of Nutrition and Dietetics recommendations.²

Data Analysis

Group difference in VO₂ max were compared using ANCOVA with gender, BMI, and adjusted energy intake serving as covariates. Regression analysis was used to identify significant predictors of VO₂ max. Data are presented as frequencies. Analysis was conducted through IBM SPSS Statistics Version 26.

Objectives

1. To examine if college athletes are meeting dietary recommendations of carbohydrate and protein.
2. To see if intake of carbohydrate and protein is related to aerobic fitness.

Results

- Our findings suggest that 15.5% of male and 39.3% of female athletes failed to meet minimum requirements for CHO and PRO intake, respectively. Conversely, 20.0% of male and 22.0% of female athletes met or exceeded requirements for both CHO and PRO intake.
- Our findings also show that there were no statistical differences in VO₂ max between CHO and PRO intake groups (p=.517). However, regression analysis indicated that PRO intake was a significant contributor to VO₂ max (β =.112, p=.032).

Conclusions

- Our data are consistent with others and find many **college athletes are not consuming a nutritionally adequate diet.**
- Our cross-sectional findings show that **PRO intake may influence aerobic fitness level;** however, future prospective research is needed in order to better understand the impact of dietary choices on athletic performance.

Acknowledgments

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