



DIETARY INTAKE OF COLLEGIATE NCAA FOOTBALL PLAYERS: DIVISION I vs DIVISION III

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Abstract

Poor nutrition in college football players may lead to an increased risk of metabolic syndrome associated conditions. The institution may influence dietary choices. **PURPOSE:** The purpose of this study was to compare the dietary intake of in season division I (DI) and III (DIII) collegiate football players. **METHODS:** A total of 31 players, 15 DI (19, 19 - 23 yr) and 16 DIII (19, 19 - 20 yr) completed testing in the fall. Variables collected for this study included height, weight and a 24-hour diet recall. A 5-pass interview method was used to collect nutrition data which was processed using the ESHA Food Processor program. Data were compared using an independent t-test. A Pearson *r* correlation test was used to examine relationships between variables. This study was approved by the Linfield College Institutional Review Board. **RESULTS:** There were no significant differences between body mass index (BMI, DI: 28.08 ± 4.53, DIII: 28.36 ± 3.36 kg/m²), total caloric intake (DI: 4708 ± 1662, DIII: 4530 ± 1695 kcal), carbohydrate, fat, water, fiber, or micronutrient intake. However, DI players were taller (DI: 1.87 ± 0.07, DIII: 1.82 ± 0.05 m, *p* = 0.04) and consumed a higher percentage of calories from protein (DI: 21.04 ± 4.74, DIII: 17.54 ± 3.53 % kcal, *p* = 0.03). Using BMI, 67% of DI and 81% of DIII players were classified as overweight, specifically, 19% of DI and 40% of DIII players were classified as obese. Additionally, 75% of all players were overweight while 30% were classified as obese. There was a significant negative correlation of BMI with both fiber intake (36.16 ± 18.16 g, *r* = -0.442, *p* = 0.02) and relative protein consumption (2.34 ± 1.26 g/kg, *r* = -0.554, *p* < 0.001). **DISCUSSION:** There were no differences based on institution. All players met or exceeded the Dietary Reference Intakes (DRI) for macronutrients and micronutrients except for carbohydrate and potassium. Of concern, is the amount of cholesterol and sodium in the players diets. Some of the data suggests that higher BMI is correlated with poor diet choices. BMI alone is not an accurate measure for health risk in football players and future analysis will include body composition. Regardless of division classification, athletes should work with coaches, trainers, and registered dietitians to maximize performance and decrease metabolic syndrome associated health risks.

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Introduction

Previous research shows that collegiate athletes, in particular football players, are at risk for metabolic syndrome (METS). Poor nutrition in college football players may lead to an increased risk of metabolic syndrome associated conditions. Metabolic syndrome is diagnosed as having three or more factors that contribute to the direct increase of cardiovascular disease, type 2 diabetes mellitus, obesity, high blood pressure, and all cause mortality (see Table 1). Dietary intake of football players impacts their performance on and off of the field. Football players are often limited to consuming most of their caloric intake on campus. Dining facilities provide students with a variety of options. Research shows that students prefer convenience and taste over healthy choices.

Table 1: Metabolic Syndrome Criteria (NCEP ATP III)

Risk Factor	Definition
Hypertension	SBP ≥ 130mmHg or DBP ≥ 85 mmHg
Impaired FG	FG ≥ 110 mg/dL
Dyslipidemia	TG ≥ 150 mg/dL HDL: M < 40 mg/dL, F < 88cm
Abdominal Obesity	Waist circumference: M > 102cm, F > 88cm

M, male; F, female; FG, fasting glucose; TG, triglycerides; HDL, high density lipoprotein; BP, blood pressure; SBP, systolic blood pressure; DBP, diastolic blood pressure.

Purpose

The purpose of this study was to compare the dietary intake of in season division I (DI) and III (DIII) collegiate football players.

Table 2: Demographics

	All (N=31)	Division I (n = 15)	Division 3 (n = 16)
Height (m)	1.8 ± .07 (1.7 - 1.9)	1.9 ± .1 (1.8 - 2.0)	1.8 ± .1 (1.7 - 1.9)
Weight (kg)	96.4 ± 17.0 (79.4 - 113.4)	98.6 ± 21.1 (77.5 - 119.7)	94.3 ± 12.3 (82.0 - 106.6)
BMI (kg/m ²)	28.2 ± 3.9 (24.3-32.1)	28.1 ± 4.5 (23.6-32.6)	28.4 ± 3.4 (25.0 - 31.8)

Methods

All data was collected during Fall of 2018. Participants were identified as part of a larger study examining metabolic syndrome in football players.

Variables collected for this study included:

- Height and Weight
- 24-hour diet recall.

A 5-pass interview method was used to collect nutrition data which was processed using the ESHA Food Processor program (V 11.3). Data were analyzed using SPSS Version 23. Comparisons between institution included an independent t-test. A Pearson *r* correlation test was used to examine relationships between variables. This study was approved by the Linfield College Institutional Review Board.

Results

Table 3: Macronutrients

	All (N = 31)	Division I (n = 15)	Division III (n = 16)
Total Calories	4498 ± 1677 (2820 - 6176)	4467 ± 1712 (2754 - 6180)	4530 ± 1695 (2835 - 6226)
% Fat	37.9 ± 9.6 (28.3 - 47.5)	35.8 ± 11.3 (24.5 - 47.1)	40.2 ± 7.0 (33.2 - 47.2)
% Pro*	18.9 ± 4.0 (14.9 - 22.9)	20.2 ± 4.1 (16.1 - 24.3)	17.5 ± 3.5 (14.0 - 21.0)
% Carbohydrate	43.2 ± 10.0 (33.2 - 53.2)	44.1 ± 12.6 (31.5 - 56.7)	42.3 ± 6.3 (36.0 - 48.6)
Fat (kcal)	1776 ± 900 (875 - 2677)	1698 ± 995 (703 - 2693)	1859 ± 812 (1047 - 2671)
Pro (kcal)	847 ± 382 (465 - 1229)	909 ± 436 (473 - 1345)	782 ± 315 (467 - 1098)
Cho (kcal)	1874 ± 697 (1176 - 2571)	1860 ± 695 (1165 - 2555)	1888 ± 721 (1167 - 2610)
Fat (g)	197.4 ± 100.1 (97.3 - 297.5)	188.7 ± 110.6 (78.1 - 299.3)	206.6 ± 90.3 (116.3 - 296.9)
Pro (g)	212.0 ± 95.5 (116.5 - 307.5)	227.3 ± 109.1 (118.2 - 336.4)	195.7 ± 78.9 (116.8 - 274.6)
Cho (g)	468.5 ± 174.3 (294.2 - 642.8)	465.0 ± 173.8 (291.2 - 638.8)	472.2 ± 180.4 (291.8 - 652.6)
Pro (g/kg)	2.3 ± 1.3 (1.0 - 3.6)	2.5 ± 1.5 (1.0 - 4.0)	2.2 ± 1.0 (1.2 - 3.2)
Fat (g/kg)	19.8 ± 11.2 (3.1 - 47.4)	19.2 ± 12.5 (3.1 - 47.4)	20.4 ± 10.1 (5.2 - 36.6)
Cho (g/kg)	5.1 ± 2.1 (2.2 - 10.4)	5.1 ± 2.0 (2.6 - 8.5)	5.2 ± 2.3 (2.2 - 10.4)

Table 4: Micronutrients

	All (N = 31)	Division 1 (n = 15)	Division 3 (n = 16)
Water (g)	2924.3 ± 1605.0 (1319.3 - 4529.3)	2642.5 ± 1540.4 (1102.1 - 4182.9)	3223.7 ± 1667.0 (1556.7 - 4890.7)
Fiber (g)	36.2 ± 18.2 (18.0 - 54.4)	33.1 ± 14.3 (18.8 - 47.4)	39.4 ± 21.5 (17.9 - 60.9)
Sugar (g)	166.6 ± 78.3 (88.3 - 244.9)	177.8 ± 78.1 (99.7 - 255.9)	154.8 ± 79.3 (75.5 - 234.1)
Cholesterol (mg)	1131.8 ± 755.0 (376.8 - 1886.8)	1232.0 ± 941.7 (290.3 - 2173.7)	1025.3 ± 496.8 (528.5 - 1522.1)
Sodium (mg)	8388.1 ± 3828.6 (4559.5 - 12216.7)	7336.4 ± 2766.2 (4570.2 - 10102.6)	9505.6 ± 4530.3 (4975.3 - 14035.9)
Potassium (mg)	3022.1 ± 2157.6 (864.5-5179.7)	3347.2 ± 2470.7 (876.5-5817.9)	2676.8 ± 1781.2 (895.6-4458.0)
Vitamin D (IU)	299.2 ± 257.7 (41.5-556.9)	266.3 ± 230.1 (36.2-496.4)	334.2 ± 287.4 (46.8-621.6)



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Figure 1: Percent Calories from Macronutrients

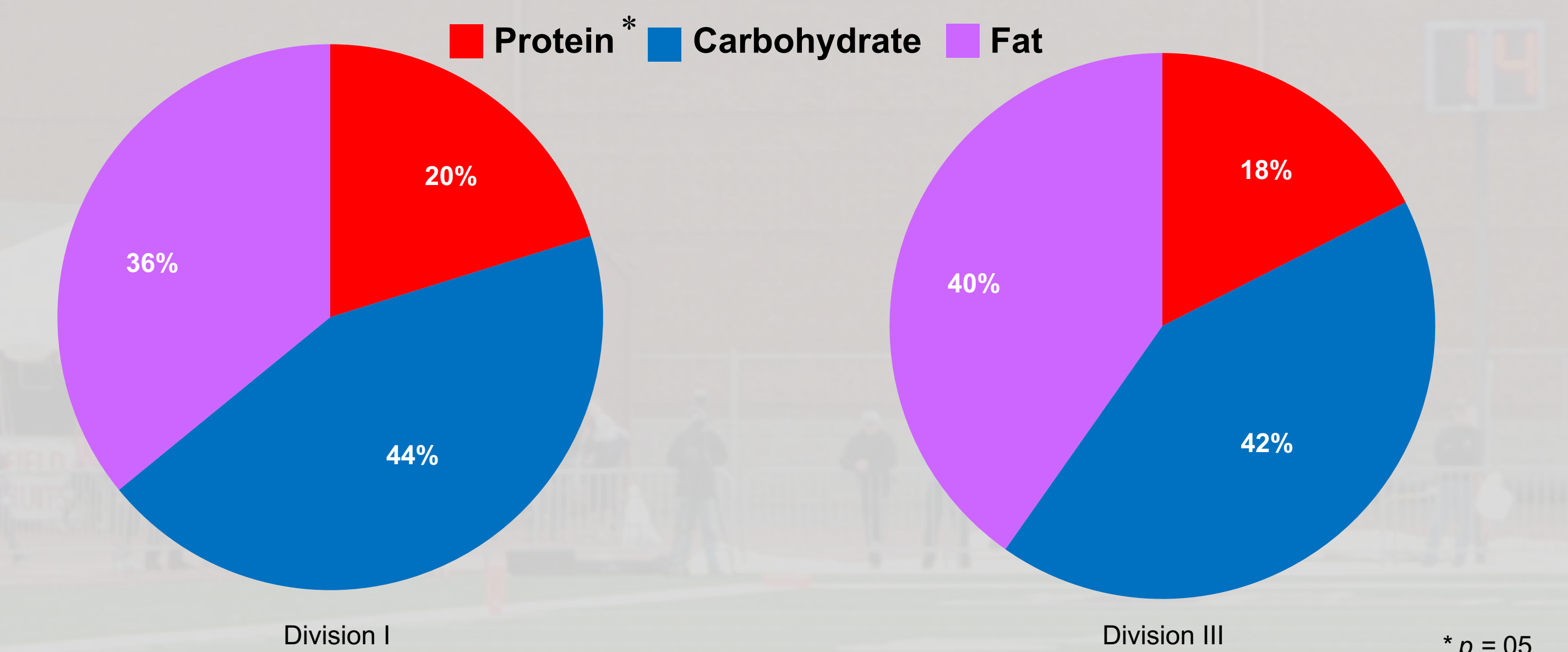
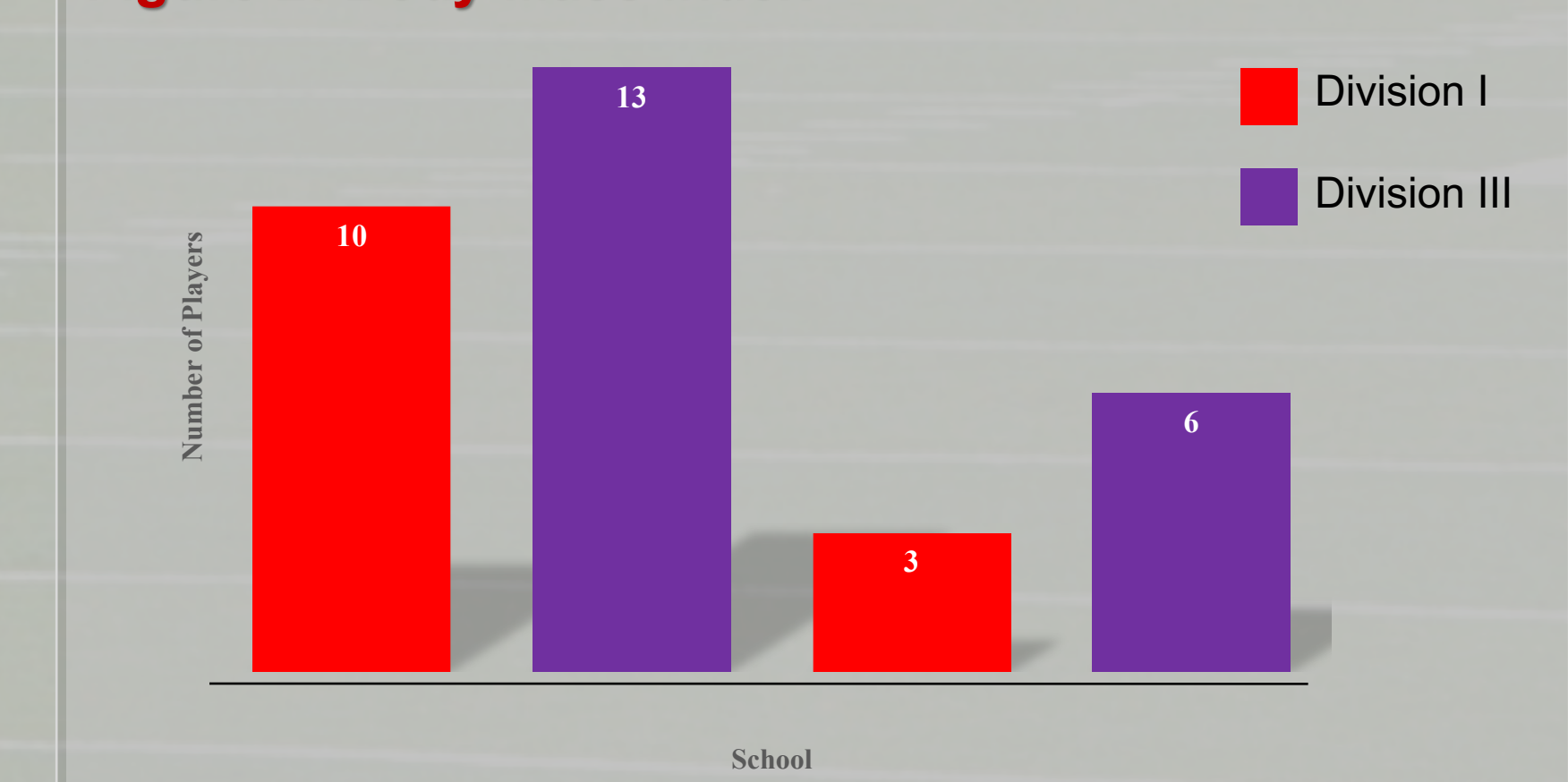


Figure 2: Body Mass Index



Discussion

- There were no significant differences in any variables between DI or DIII institutions, except for percent of calories from protein and player height.
- The athletes in the current study consumed a higher amount of protein per kg than recommended (1.6-1.7 g protein/kg body mass, see Table 3). Most athletes consumed 2/3 of their protein source from animal products, which leads to a higher intake of saturated fat. This combined with high BMI (see Figure 2) puts the athletes at risk for cardiovascular and metabolic disease.
- All football players in the current study consumed an average of 8% more calories from fat compared to the current DRI (less than 30%), which may lead to increased abdominal fat. Anecdotally, players reported consuming convenient and high caloric option, such as pizza, hamburger, and fried chicken sandwiches.
- Players consumed 43% of calories from carbohydrates; the current DRI is 45-65% of total calories. Researchers recommend football players consume 5-7 g of carbohydrates/kg body weight/day to efficiently restore muscle glycogen. The average carbohydrate consumption (g/kg body weight), for the current players, was on the low end of the recommended range and some players were consuming as low as 2 g/kg.
- Fiber and protein were negatively correlated to BMI. Fiber intake was within the DRI values (35-38 g), but the overall range was wide indicating over one third of the players did not consume enough fiber (see Table 4).

Conclusion

Regardless of division classification, athletes should work with coaches, trainers, and registered dietitians to maximize performance and decrease metabolic syndrome associated health risks.

Study Limitations

- Subject recall reliability
- Subjects were scared or embarrassed to share what they ate
- Lack of participants
- Inaccurate analysis from ESHA software
- Participant bias

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References Available on Request