optimize performance). This study investigated the effect of consuming water or a carbohydrate (CHO)-electrolyte sports beverage (‘Sports Drink’) ad libitum with food during a 4h post-exercise recovery period on fluid restoration, nutrient provision, and subsequent endurance cycling performance.

METHODS: On two occasions, 16 trained cyclists, 8 male (M) (age: 31±9y; VO2max: 54±6mL.kg⁻¹.min⁻¹) and 8 female (F) (age: 33±8y; VO2max: 50±7mL.kg⁻¹.min⁻¹), lost 2.3±0.3% and 1.6±0.3% of their body mass (BM) (respectively) during 1h of fixed-intensity cycling. Participants then had ad libitum access to either Water or Sports Drink (103kJ·L⁻¹; 5.8g CHO·L⁻¹) and food for the first 195 min of a 4h recovery period. At the end of the recovery period, participants completed a cycling performance test (45 min fixed-intensity pre-load and an incremental test to exhaustion [peak power output, PPO]). Beverage intake; water/nutrient intake; and indicators of fluid recovery (BM, urine output, plasma osmolality [Pオスモ]) were assessed throughout trials.

RESULTS: Participants returned to a similar state of positive fluid balance prior to recommencing exercise, regardless of the beverage provided (Water: +0.4±0.5 L; Sports Drink: +0.3±0.3 L, p=0.529). While Sports Drink increased post-exercise energy (M: +1.8±1.0MJ; F: +1.3±0.5MJ) and CHO (M: +14±31g; F: +8±25g) intake (p<0.001), this did not affect subsequent endurance cycling performance (Water: 337±40W [M] and 252±50W [F]; Sports Drink: 340±40W [M] and 258±47W [F], p=0.242).

CONCLUSIONS: Recovery beverage recommendations should consider the post-exercise environment (i.e. availability of food), an individual’s tolerance for food/fluid, the immediate requirements for refueling (e.g. CHO demands of subsequent activity) and the athlete’s overall dietary goals.


1140 Board #7 May 30 9:30 AM - 11:30 AM
A Pilot Nutrition Education Intervention with Division I Women’s Basketball Players
Emily N. Werner, Alyssa Guadagni, James M. Pavnik, FACSM. Michigan State University, East Lansing, MI. (Sponsor: James M. Pavnik, FACSM)
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Appropriate nutrition is important for both health and optimization of sport performance; however, many athletes do not have sufficient nutrition knowledge to engage in ideal nutrition practices. Few studies have been conducted to investigate the efficacy of a nutrition education intervention on athletes’ nutrition knowledge, and even fewer have done so using a validated assessment tool.

PURPOSE: To evaluate changes in nutrition knowledge of NCAA Division I women’s basketball players after a sport-focused nutrition education intervention using a validated nutrition knowledge survey.

METHODS: NCAA Division I women’s basketball players (N=8) completed a validated nutrition knowledge survey (Callella et al., 2017) that evaluated both general and sport nutrition knowledge. Athletes then participated in six, once weekly, 20-minute nutrition education sessions led by a Registered Dietitian. Topics included: hydration, carbohydrates, protein, fats, meal planning, and micronutrients/supplements. At the end of the six weeks, the survey was re-administered. Scores were summed as +1 for a correct answer and +0 for no answer, an incorrect answer, a double-answer, or the “I don’t know” option. Maximum possible score was 97. A paired-samples t-test was conducted to evaluate baseline versus follow-up scores.

RESULTS: At baseline, athletes scored 40.5±18.0 out of 97 possible, 27.0±12.7 out of 64 possible, and 13.5±6.2 out of 33 possible for the total survey, general nutrition and sport nutrition sections, respectively. Significant average score increases were found for the total survey overall (62.2±11.7, p=0.004), within the general nutrition section (40.4±7.7, p=0.015), and within the sport nutrition section (21.9±5.9, p<0.001).

CONCLUSION: The education intervention used in this pilot study succeeded in increasing nutrition knowledge of Division I women’s basketball players. Future research should include intake assessments to determine whether eating habits improve after nutrition education.

This research was funded by the MSU College of Education via a Summer Research Fellowship.

1141 Board #8 May 30 9:30 AM - 11:30 AM
The Importance of Iron Testing for D3 Cross Country Runners
Preston Kauder, Nathan Goslin-Klemme, Jake Till, Elaina Biechler. Loras College, Dubuque, IA. (Sponsor: Vincent Paolone, FACSM)
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PURPOSE: Iron is an important mineral carried throughout the body, which helps carry oxygen rich molecules via hemoglobin. For endurance athletes, blood iron levels may be an important predictor of performance. Previous research has shown that iron absorption rates are lower in athletes in comparison to sedentary individuals. The purpose of the current investigation was twofold: first, to measure pre-season blood iron levels in division III collegiate cross country runners to determine if iron deficiency existed, and secondly, improve blood iron levels with a five week nutrition intervention for subjects classified as low.

METHODS: Capillary puncture was utilized to measure blood iron levels during the week of pre-season practice in division III male (N=26) & female (N=20) cross country runners. Athletes were classified as low iron if the males were below 15.0mg/dL, and 12.0mg/dL for the females. If subjects were classified as low, they received a nutritional pamphlet as an intervention, and were retested five weeks later.

RESULTS: The researchers classified 26.9% of males as iron deficient, and 5.00% of females as deficient. After retesting the deficient subjects, a paired t-test was utilized to determine if significant improvements in blood iron occurred following the five week intervention. A p-value of 0.002 (2-tail) was yielded showing a significant improvement in hemoglobin levels from pre-season in comparison to 5 weeks following the intervention (12.28 +/- 1.0 9, 13.94 +/- 0.25 respectively).

CONCLUSIONS: After a five week intervention, iron levels in those previously deficient, were significantly improved. Iron is a significant mineral for athletes, especially runners who are greatly dependent on oxygen for their performance. Thus, making sure cross country runners are educated on good nutritional habits, allowing them to maintain the said desirable blood iron levels is key to optimize their performance. Lastly, meeting the recommended guidelines for iron is vastly important, and educating athletes can result in a substantial improvement in blood iron levels.

C-07 Thematic Poster - Clinical Exercise Physiology: Exercise and Type 2 Diabetes
Thursday, May 30, 2019, 9:30 AM - 11:30 AM
Room: CC-101B

1142 Chair: R. Scott Rector, FACSM. University of Missouri, Columbia, MO.

1143 Board #1 May 30 9:30 AM - 11:30 AM
Impact Of Exercise Program On Trajectories Of Hba1c And Weight In Older Veterans
Jamie Giffuni, Rebecca Melvin, Bethany Lyons, Odesa Addison, Alyssa Stookey, Leslie Katzel. Baltimore Veterans Affairs Medical Center, Baltimore, MD.
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1144
Board #2
May 30 9:30 AM - 11:30 AM
Long-Term Changes On Bdnf And Igf-1 In Patients With T2dm - Training At Different Intensities
João P. Magalhães, Pedro B. Júdice, Megan Hetherington-Rauth, Duarte neto, Catarina Matias, Luís B. Sardinha, Faculdade de Matrícula Humana, Universidade de Lisboa, Lisbon, Portugal.

A growing body of evidence suggests that exercise can influence the central nervous system through circulating growth factors that can cross the blood-brain barrier. Among these factors are the brain-derived neurotrophic factor (BDNF) and insulin-like growth factor-1 (IGF-1), which work simultaneously to improve brain plasticity and functioning. However, the long-term effects of different exercise intensities on BDNF and IGF-1 in patients with type 2 diabetes mellitus (T2DM) have never been examined.

**RESULTS**

After adjustment for sex and baseline moderate-to-vigorous physical activity, there was no significant between-group changes for both HIT and MCT on BDNF (β=0.05, p=0.474; HIIT: β=0.01, p=0.950) and IGF-1 (MCT: β=1.73, p=0.358; HIIT: β=2.75, p=0.175) in the intention-to-treat analyses. With similar results, the per protocol analyses (>70% adherence to prescribed sessions) showed no significant changes for both MCT and HIIT on BDNF (MCT: β=0.03, p=0.723; HIIT β=0.03, p=0.602) and IGF-1 (MCT: β=0.52, p=0.829; HIIT β=1.84, p=0.455).

**CONCLUSIONS**

These findings indicate that a 12-month intervention using a combination of HIIT with RT or MCT with RT had no significant impact on serum levels of both BDNF and IGF-1 in patients with T2DM. There is a heterogeneous and wide response to exercise on BDNF and IGF-1, especially when considering long-term interventions. Thus, future studies on the long-term effects of exercise are warranted to better understand the influence of these specific growth factors on brain health.

1145
Board #3
May 30 9:30 AM - 11:30 AM
Vascular Changes In Patients With T2DM Following 1-year Of Exercise, Irrespective Of Cardiorespiratory Fitness Improvement
Megan Hetherington-Rauth1, João P. Magalhães1, Pedro B. Júdice1, Xavier Melo2, Luís B. Sardinha1, 1Faculty of Human Kinetics, University of Lisbon, Lisbon, Portugal, 2Ginástico Clube Português, Lisbon, Portugal.

Micro- and macro-vascular changes occurring in patients with type 2 diabetes mellitus (T2DM) are major contributors to the development of cardiovascular disease, a leading cause of morbidity and mortality for these individuals. Increased cardiorespiratory fitness (CRF) from exercise training has been associated with improvements in metabolic and vascular health outcomes. Despite mean improvements in CRF from exercise training there remains a portion of participants having little or no improvement.

**PURPOSE**

To examine the effectiveness of a 1-year intervention involving a control group, moderate continuous training or high-intensity interval training combined with resistance training in patients with T2DM.

**RESULTS**

There were no significant differences in carotid intima-media thickness, vascular function, and density coefficient between groups. Furthermore, no improvements in the remaining vascular indices and hemodynamic variables were observed.

**CONCLUSIONS**

Regarding the effectiveness of different CRF interventions is still an important issue to address, as many patients with T2DM show no improvement, and the main reason is still unknown.

1146
Board #4
May 30 9:30 AM - 11:30 AM
Influence of High Intensity Body-Weight Circuit Training in Adults with Type II Diabetes
Brian Kliszczewicz, FACSM, Robert Buresh, FACSM, Emily Bechke, Kennesaw State University, Kennesaw, GA.

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**PURPOSE**

To determine the effectiveness of a 15-week intervention of a minimal dose high-intensity bodyweight circuit (HIBC) program in persons with type 2 diabetes (T2D) on markers of metabolic function, autonomic balance, and body composition.

**METHODS**

Three females (55±4y) and two males (64±1y) with T2D underwent assessments of glycosylated hemoglobin (HbA1c) and fasting plasma glucose (FG), insulin (INS), and lipids. Body composition was determined using dual-energy x-ray absorptiometry, aerobic fitness (submaximal treadmill test), blood pressure (SBP/DBP), and resting heart rate (RHR) were assessed. Participants completed 15-weeks of bodyweight circuit training (10 banded bodyweight squats, 5 modified pull-ups, 5 modified push-ups, 10 abdominal crunches). Participants completed as many cycles as possible in each session. Session duration progressed from 5-10 minutes, as tolerated, and session frequency progressed from 3-4 sessions per week. All assessments were repeated after 15 weeks of training.

**RESULTS**

Body composition: Pre and Post changes in mean weight (p = 0.395), body fat % (p = 0.632), lean mass (p = 0.372). Aerobic fitness: estimated VO2max (p = 0.232), SBP (p = 0.062), DBP (p = 0.90), RHR (p = 0.727). Metabolic biomarkers: FG (p = 0.942), HDL (p = 0.271), LDL (p = 0.671), HbA1c (p = 0.810), INS (p = 0.762).

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