24th Annual

SYMPOSIUM OF STUDENT SCHOLARS

VIRTUAL EDITION

APRIL 2020

Recognizing excellence in student scholarship and creative activity

KENNESAW STATE UNIVERSITY

24th Annual Symposium of Student Scholars

April 16, 2020

Program

9:30am – 12:00pm: Concurrent Sessions
12:00pm – 1:15pm: Lunch Discussion Sessions
1:30pm – 4:45pm: Concurrent Sessions

Abstracts

WellStar College of Health and Human Services

Exercise Science and Sport Management

The Association Between Caffeine and Insulin Sensitivity in Non-Diabetic Young Women
Poster Presentation - Join now.
1:45pm-2:00pm
Undergraduate Student(s): Raine Morris
Research Mentor(s): Katherine Ingram, Janeen Amason

Introduction: *Insulin sensitivity refers to how the body cells respond to the hormone insulin and is affected by several factors such as physical activity and body composition. Recent research studies have identified relationships between insulin sensitivity and intake of caffeine, a popular stimulant. While the mechanism by which it affects insulin sensitivity is unknown, there are some studies that show a positive relationship between insulin sensitivity and caffeine intake and others that show a negative relationship. More research is needed to fully identify the association between the two in order to understand the mechanism completely.* ***Purpose****: The purpose of this study is to examine the association between the intake of caffeine and insulin sensitivity.* ***Methods****: 38 non-diabetic women completed the study (Age, 20.7± 2.8 years; BMI27.6 ±3.6). Diet was self-reported using the Automated Self-Administered 24-hour (ASA 24) questionnaire. Matsuda Insulin Sensitivity Index was calculated using the plasma glucose and plasma insulin results from a 2-hour OGTT with blood samples taken at 0, 30, 60, and 90 minutes. SPSS will be used to analyze the relationship between caffeine and insulin sensitivity with correlation and regression statistics.* ***Results:*** *The results will be presented at the 2020 KSU Symposium of Student Scholars.*

Gestational Diabetes: What About Your Exercise?
Poster Presentation - Join now.
2:15pm-2:30pm
Undergraduate Student(s): Andreana Henry
Research Mentor(s): Katherine Ingram

Previous research on exercise as a form of preventative care to reduce the risk of gestational diabetes has produced conflicting views. Our current research will evaluate whether exercise frequency during pregnancy is linked to the likelihood of experiencing gestational diabetes. Participants in this postpartum study will complete a MAMA survey, conducted with Qualtrics. The participants will use a Likert scale to answer questions about their frequency of exercise and the presence or absence of gestational diabetes during their pregnancy within the last two years.The MAMA survey will compare the frequency of exercise during their pregnancy as well as the percent of women who reported having

gestational diabetes with the intention of evaluating their statistical relationship. This survey will collect data until April 10, 2020 and present the findings at the student symposium.

Sex Differences in Plantar Flexor Strength and Contractile Properties after Isometric and Dynamic Fatigue
Oral Presentation - Join now.
10:00am-10:15am
Graduate Student(s): Phuong L. Ha, Benjamin E. Dalton, Michaela G. Alesi
Undergraduate Student(s): Tyler M. Smith, Anna G. Conroy
Research Mentor(s): Garrett M. Hester, Trisha A. VanDusseldorp, Yuri Feito

Purpose*: To determine sex differences in strength and contractile properties after isometric and dynamic fatiguing exercise of the plantar flexors.* ***Methods****: Recreationally active males (n=13, age=22.4±2.2 yrs) and females (n=15, age=20.9±2.4 yrs) performed a maximal isometric (2 min) and isotonic (120 reps at 30% peak torque) fatigue task on 2 separate visits. Before and after each fatigue task, participants performed a 3 sec maximal voluntary isometric contraction (MVIC) with tibial nerve stimulation being delivered during and immediately after the MVIC. Peak torque (PT; highest 250 ms) was obtained during the voluntary phase of the MVIC. Peak twitch torque (T_{TQ}), rate of torque development (RTD; Δtorque/Δtime), and half relaxation time (HRT; time for $T_{TQ}$to decrease from peak to 50%) were calculated from the resting twitch after the MVIC. Voluntary activation (VA%; ability of the muscle to be fully activated) was calculated using a corrected interpolated twitch formula. Three-way (condition × sex × time) repeated measures ANOVAs were used for analysis.* ***Results****: Regardless of sex or condition, T_{TQ}(-23.1%), RTD (-12.6%), HRT (+22.9%) were changed after fatigue ($p<0.05$), while VA% remained unchanged ($p>0.05$). Regardless of condition, PT was more reduced in males (-22.5%) compared to females (-19.2%)($p=0.017$).* ***Conclusions****: Our findings indicate that the fatigue-induced decrease in strength was greater in males than females. While our findings do not identify the contributing physiological mechanism(s), changes at the peripheral level may be responsible.*

Chair Rise Kinetics and Correlates of Performance in Young and Older Males
Oral Presentation - Join now.
10:45am-11:00am
Undergraduate Student(s): Tyler Smith
Graduate Student(s): Phuong Ha, Alex Olmos, Matthew Stratton, Alyssa Bailly, Micah Poisal, Joshua Jones, and Benjamin Dalton
Research Mentor(s): Garrett Hester, Trisha VanDusseldorp, Yuri Feito

Purpose: *To compare chair rise kinetics in young (YM) and older (OM) males, and determine correlates of chair rise performance.* ***METHODS:*** *YM (n=15, age =20.7±2.2 yrs) and OM (n=15, age=71.6±3.9yrs) performed three trials of a single chair rise as quickly as possible on a force plate and the vertical ground reaction force (VGRF) signal was analyzed. Peak VGRF (PF), as well as peak (100 ms rolling average), early (minimum VGRF to 50% PF), late (50% PF to PF), and overall (minimum*

VGRF to PF) rate of force development (RFD; Δforce/Δtime) were calculated based on phases of the task. Power and velocity parameters as well as quadriceps rate of electromyography rise (RER) were also obtained. Independent samples t-tests were used for age comparisons, and Pearson correlation coefficients were calculated for each group to examine select relationships. ***RESULTS:*** *Chair rise time, average power, early RFD, and leg lean mass were similar between groups (p>0.05). All other power, velocity, RFD, and RER measures were lower in OM (p<0.05). PF and all RFD measures, except late RFD, were strongly correlated with chair rise performance in OM, while PF and peak RFD were only moderately correlated with performance in YM.* ***CONCLUSIONS:*** *As expected, most kinetic variables were diminished in OM, but our data indicate that average power and early RFD are not sensitive to age. Further, PF and RFD are more associated with chair rise time and power in OM compared to YM, yet neither lower-body lean mass nor rapid muscle activation are influential.*

Two Models for Assessment of Body Composition during Pregnancy and Their Associations with Insulin Resistance

Poster Presentation - Join now.
2:45pm-3:00pm
Undergraduate Student(s): Ami Eho, Calah Coleman
Research Mentor(s): Katherine Ingram, Janeen Amason

Introduction: *High levels of body fat are associated with cardiometabolic conditions, like insulin resistance, a precursor to diabetes. It is challenging to study these associations in pregnancy because body water levels fluctuate widely. The best known formula—the four-compartment model (4CM)— is unsuitable to use during pregnancy because it requires bone mineral content (BMC) from dual-energy x-ray absorptiometry (DEXA), which can only be used postpartum because of radiation exposure. Objective: This study compares the associations between two formulas used to measure body fat content (a 4CM and a two compartment model (2CM) that does not require BMC) and insulin resistance during pregnancy.* ***Methods:*** *At 20 weeks gestation, 33 pregnant women (73.1% white, aged 27.6±4.2 years, BMI 27.6±6.3) received body composition measures: body density (BD) via air displacement plethysmography (BodPod) and total body water (TBW) via bioelectrical impedance (InBody 720). Bone mineral content (BMC) was measured post-partum using DEXA. Body fat was calculated by 4CM (Selinger: [(2.747/BD) - .714(TBW/wght) +1.129(BMC/wght) - 2.037] x 100) and 2CM (Van Raaij: Wght-(TBW/0.732)). Insulin resistance was calculated by the Homeostasis Model Assessment of Insulin Resistance (HOMA-IR= fasting insulin (mU/L) x fasting glucose (mg/dL)/405) measured from fasting blood measures collected at 24-26 weeks gestation. Correlation analyses were used to assess relationships among the two body composition models and HOMA-IR.* ***Results:*** *The mean percent body fat was 40.5 ±7.1% using 4CM and 38.7 ±7.3% using 2CM. Both formulas were in close agreement with one another (r=.970, p<.001). HOMA-IR was strongly correlated to both 4CM (r=.524, p=.009) and 2CM (r=.547, p=.006).* ***Conclusion****: The results indicate that estimating body composition using a 2CM would be an appropriate substitute for a 4CM in pregnant women.*

FATIGUE-INDUCED SEX DIFFERENCES FOR EXPLOSIVE NEUROMUSCULAR CHARACTERISTICS OF THE PLANTAR FLEXORS

Poster Presentation - Join now.
3:15pm-3:30pm
Graduate Student(s): Ben Dalton, Phuong Ha, Michaela Alesi
Undergraduate Student(s): Tyler Smith, Anna Conroy
Research Mentor(s): Garrett Hester, Trisha VanDusseldorp, Yuri Feito

Previous research on fatigue using isometric contractions suggests that females are more fatigue resistant than males, but less is clear regarding fatigue induced by dynamic contractions. ***PURPOSE:*** *To determine sex differences for explosive voluntary neuromuscular characteristics of the plantar flexors (PFs) during a dynamic fatiguing task.* ***METHODS:*** *Recreationally active males (n=14; 22.4±2.2 yrs) and females (n=15; 20.9±2.5 yrs) performed a fatiguing task of the PFs consisting of 60 maximal isotonic contractions at 30% of their maximal isometric strength using a dynamometer. Peak power (PP), optimal velocity (OV), and optimal torque (OT) were calculated from the first five contractions of the fatigue task and five maximal isotonic contractions performed after the fatigue task. Power was calculated as the product of angular velocity and torque and PP was recorded. In addition, velocity and torque at the moment in time PP occurred were recorded as OV and OT, respectively. Rate of electromyography rise for the medial gastrocnemius (RER_{MG}) and soleus (RER_{SOL}) was calculated as the linear slope of the normalized electromyography-time curve. Two-way (time ´ group) repeated measures ANOVAs were used to determine sex differences across time.* ***RESULTS:*** *Regardless of sex, PP (-16%; RER_{SOL} remained unchanged for both sexes (-6%; p>0.05), while RER_{MG} was only reduced in males (-21%;p=0.001).* ***CONCLUSION:*** *Our data indicate that explosive contractile characteristics are diminished similarly in males and females during a dynamic fatiguing task, but it appears the muscle-specific physiological mechanisms may differ between sexes.*

The Relationship Between Adiponectin and Dietary Iron in Non-Diabetic Young Women

Poster Presentation - Join now.
3:45pm-4:00pm
Undergraduate Student(s): Calah Coleman, Ayaa Woday
Research Mentor(s): Katherine Ingram, Brian Kliszczewicz

Introduction*: Adiponectin is a protein-based hormone that is secreted by adipocytes and assists in several metabolic processes including glucose regulation and fatty acid oxidation. Low adiponectin levels have been linked to metabolic conditions such as increased insulin resistance and obesity. Previous studies have shown that circulating iron has an inverse relationship with adiponectin levels. It is unknown whether dietary iron has the same association with adiponectin levels.* ***Purpose****: The purpose of this study is to examine the relationship between dietary iron intake and adiponectin levels.* ***Methods****: This study examined 42 non-diabetic women (Age: 20.7 ±2.8 years; BMI 27.6 ±3.6). The subjects' dietary nutrient intake was assessed using a self-reported method through the Automated Self-Administered 24-hour (ASA 24) questionnaire. Subjects visited the KSU Human Performance*

Laboratory after an overnight fast. Body composition was measured using dual energy x-ray absorptiometry (DXA). Blood samples were collected, separated, and plasma was frozen and stored until analysis. Plasma adiponectin levels were analyzed using a commercially available enzyme-linked immunosorbent assay (ELISA) kit. A partial correlation analysis was controlled for age and race. A pearson's correlation analysis was used to assess the association between adiponectin and dietary iron intake. ***Results****: In this study population, adiponectin was not significantly associated with dietary iron (r= 0.061, p > 0.05).* ***Conclusions****: Though it has been previously shown that adiponectin is negatively associated with circulating iron levels, our data indicates that adiponectin is not related to dietary iron intake.*

EFFECTS OF DYNAMIC FATIGUE ON RATE OF VELOCITY AND TORQUE DEVELOPMENT IN MALES AND FEMALES

Poster Presentation - Join now.
4:15pm-4:30pm
Graduate Student(s): Benjamin Dalton, Phuong Ha, Michaela Alesi
Undergraduate Student(s): Tyler Smith, Anna Conroy
Research Mentor(s): Garrett Hester, Trisha VanDusseldorp, Yuri Feito

Time-dependent measures such as rate of velocity (RVD; Δvelocity/Δtime) and torque (RTD; Δtorque/Δtime) development are important contributors to peak power during a dynamic muscle contraction. However, sex differences in the fatigability of these parameters remain relatively unexplored. Purpose: To determine sex differences for RVD and RTD of the plantar flexors (PFs) during a dynamic fatiguing task. Methods: Recreationally active males (n=14; 22.4±2.2 yrs) and females (n=15; 20.9±2.5 yrs) performed a fatiguing task of the PFs consisting of 60 maximal concentric isotonic contractions at 30% of their maximal isometric strength using a dynamometer. RVD and RTD were obtained from the first five contractions of the fatigue task and five maximal isotonic contractions performed after the fatigue task. Strong verbal encouragement was provided, and participants were instructed to perform the muscle contractions "as hard and fast as possible". RVD and RTD were calculated as the linear slope of the velocity- and torque-time curve, respectively. Two-way (time ´ sex) repeated measures ANOVAs were used to determine sex differences across time. Results: Regardless of sex, RVD was decreased (-14%; p<0.001), however, RTD was reduced in males (-18%; p=0.001) but not females (-8%; p=0.162) following the fatigue protocol. Conclusions: These data indicate that fatigue-induced decrements in quick velocity and torque production during dynamic exercise are different between sexes. Females appear to preserve the ability to produce torque quickly better than males in a fatigued state.

Health Promotion and Physical Education

ARPets

Oral Presentation - Join now.
11:45am – 12:00pm

Undergraduate Student(s): Cooper Freeman
Research Mentor(s): Rongkai Guo

This paper presents a mobile app using Augmented Reality (AR) technology to allow the players to adopt a virtual pet. The purpose was to have the player virtually buy food and drinks for their pet, using points earned by playing minigames or perform other activities to keep the pet healthy. There are certain rewards and penalties in the app to certain statistics such as hunger, thirst, energy, and happiness based on the food or drink that was selected. This was meant to encourage the user of the app to consider the benefits and drawbacks of what they eat and drink. The intent was to observe if the users could understand how to keep the pet healthy and happy in the app.

A Close Examination of Self-Care Among College Students
Oral Presentation - Join now.
9:45am – 10:00am
Undergraduate Student(s): Adrianna Jackson
Research Mentor(s): Mari-Amanda Dyal

BACKGROUND: Self-care is not a groundbreaking concept but is very open to interpretation and popular in the chronic disease management literature. The current emphasis on self-care and disease management is well placed; however, it has led to gaps in self-care understanding as it relates to other populations, such as college students. College life is a state of transition that can be challenging for students. When academic and life pressures compete, college students engage in unhealthy behaviors to cope, which takes a toll on their mental and physical health. A self-care focus on college students is required to understand and identify their self-care perceptions, behaviors, protective factors, and risk factors, especially given the rich diversity of today's student population. METHODS: An extensive literature review will occur to identify what contributions there are in the self-care field as it relates to college students. Additionally, subject matter expert interviews and college student focus groups will be conducted to assess the current state of self-care within a Georgia-based college environment. These formative research activities will inform an evidence-based pilot workshop for students featuring self-care strengthening education and application. RESULTS: It is anticipated that literature review results will reveal significant research gaps as it relates to the college student population. Interviews and focus groups will yield rich qualitative data required to build a workshop that is relevant and useful to the intended population. Lastly, the workshop will 1) strengthen student self-care perceptions and behaviors and 2) provide practitioners with a self-care model to implement in this setting. CONCLUSIONS: Self-care among the college student population requires a deeper discussion than what is currently available. Self-care is not ground-breaking, but for this population that is faced with mounting risk factors, it could make all the difference in health and academic outcomes.

The Influence of Mechanical Properties Associated with Exercise Equipment Padding on Maximizing Performance and Minimizing Potential Soft-Tissue Injury when Performing High-Intensity Weight Lifting Exercises

Poster Presentation - Join now.
1:30pm-1:45pm
Undergraduate Student(s): Robert Hewston
Research Mentor(s): Michael Hales, Mohammad Jonaidi, John Johnson

The intention of this study is the measurement of mechanical properties such as resilience and compressibility associated with exercise equipment padding in order to determine the ability to minimize potential soft-tissue injuries while performing high-intensity weight lifting exercises. ASTM standards were used to test the resilience and compressibility of five different exercise equipment padding specimens. The specimens consisted of standard bench press foam, composite foam, polyethylene foam, a single yoga mat foam, and double yoga mat foam. The resilience and compressibility are tested to determine the amount of deformation each sample can experience and the level of energy returned back to the user while performing high-intensity weight lifting exercises. To obtain the data for the resilience test a testing-rig was first designed and assembled for the specific needs of testing exercise equipment padding according to ASTM Standard D3574-17. Three tests were performed on each sample, noting the percentage of rebound, and the mean value for each specific specimen was calculated as the final value. A second round of testing occurred on the same specimens using a one-and-a-half-inch piece of plywood under the specimen. The testing revealed the standard bench press foam to have the highest resilience at 37.8%, and the polyethylene foam to have the lowest resilience at 8%. The second round of testing also showed the standard bench press foam to have the highest resilience at 33.2% and the polyethylene foam to have the lowest at 5.2%.

Nursing

KSU SNA Period Party Project: Advocating for Women's Health in the Homeless Population of Kennesaw State University
Poster Presentation - Join now.
2:00pm-2:15pm
Undergraduate Student(s): Alice Barry
Research Mentor(s): Linda Sutton, Doreen Wagner

In one of the wealthiest countries in the world, women are being deprived of the basic human right of access to proper feminine hygiene products and education. The purpose of this service leadership project was to review current literature to describe menstrual hygiene as a basic human right, to explore the cost/access to feminine hygiene products in multiple studies, to examine political and international initiatives surrounding access to feminine hygiene products, and to synthesize how nursing students can advocate for primary care and health promotion in the community in which they live. The project aimed to address the overwhelming need for access to feminine hygiene products for homeless college women on the KSU campus ("About Care," 2019). This paper describes the creation and implementation of the Kennesaw State University (KSU) Student Nurses Association (SNA) Period Party Project. The project was promoted by the KSU WellStar School of Nursing SNA members to

provide donations of menstrual pads, tampons, and panty liners that were assembled into individual period packages. All SNA members were invited to the 1-hour event where individual period packages were assembled by 37 members. The KSU SNA addressed the stigma surrounding menstrual health through the Period Party Project and hand-delivered 200 individual period packages to the KSU CARE Services pantry to aid homeless women on the KSU campus.