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Comparison of Heart Rate Intensity in Practice, Conditioning, and Games in NCAA Division I Basketball Players

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An athlete's heart rate (HR) is an important variable in quantifying the intensity of exercise. Workouts that increase HR are an important stimulus for training adaptations and conditioning. At other times, workouts that do not overly stress the HR may be desired to allow for recovery. The principle of specificity emphasizes that athletes should train specific to the way they will need to perform in competition. Because of this, monitoring HR during training and competition can be a useful tool. While exercise intensity in endurance sports has been previously investigated, less is known regarding the HR response in team sports, particularly women's basketball. **Statement of the Problem:** The purpose of this study was to compare the average HR response to basketball training and competition in: 1) open gym 5 on 5 scrimmage, 2) an actual basketball game against a different opponent, and 3) conditioning session. **Methods/Procedures:** We had an NCAA Division I women's basketball wear heart rate monitors for open gym scrimmages, actual games, and conditioning practices. For the open gym sessions, the team scrimmaged against each other 5v5 for ~90 minutes and the average HR over 4 open gym sessions was determined. For the actual games against other opponents, the average HR response for the team was averaged over 3 games. The conditioning sessions consisted of repeated, intermittent short sprint efforts over the course of 30-60 minutes, and the average HR over 7 conditioning sessions was calculated. HR averages across the three conditions were compared by one-way ANOVA. **Results:** As indicated in the table, during open gym scrimmages and conditioning sessions, the women had a higher heart rate average as a whole team compared to the games.

	5v5 Open Gym	Conditioning	Games
%HR Max	75 ± 6%	74 ± 5%	63 ± 9%*

*p < .05

Conclusion: The 5v5 open gym scrimmages reflect the exercise intensity when all the players are playing similar minutes. The average intensity for the team during their conditioning sessions was similar to this, which would indicate that they are training at the specific intensities they need to condition for on court play. However, the average HR intensity for the team during games was lower because not all of the women would play the same amount of time or play at all during an actual game. For the starters on the basketball team or the players that play the majority of the game, they should be able to stay in shape throughout the 4 month season because their training stimulus is greater two days a week for games. However, for the players that play minimally during the game, their training stimulus is limited to practices. The bench players should find a way to work out on the game-days they do not play to help them keep their HR up and maintain an adequate training stimulus to avoid deconditioning throughout the season. This data allows coaches to help better condition their players for game situations.

Impact of Heart Rate Intensity on Shooting Accuracy during Games in NCAA Division I Women Basketball Players

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Introduction: Shooting accuracy in basketball is key to winning games. While there are various factors that contributed to shooting accuracy, the intensity of play is likely a contributing factor. A player who has played the majority of the game would likely have a higher, more intense heart rate (HR). Depending on the athlete, this could impact shooting accuracy. Examining the relationship between HR intensity and shooting accuracy has not been looked at in a real game setting before. **Statement of the Problem:** The purpose of this study was to determine the impact of heart rate intensity on shooting accuracy in a game setting in NCAA Division I female basketball players. **Method/Procedures:** We examined the team stats for shooting accuracy from overall attempts, three point attempts, and free throws during five games. During games players wore HR monitors that transmitted to a mobile app that displayed their HR in real time. Every time a shot was attempted, we recorded what kind of shot, where on the floor it came from, whether it was made or missed, and the HR zone that the athlete was at when it took place. The HR zones that were compared were 1) 70-80% HR max, 2) 80-90% HR max, and 3) 90-100% HR max. These data were input into a spreadsheet to calculate the average team shooting percentage across these three HR zones for overall shooting, free throws, and 3-pointers. **Results:** As indicated in the table, the team shooting percentage was highest for all types of shooting when players were at the lowest HR intensity. Shooting accuracy declined at higher HR intensities.

	70-80% Max HR	80-90% Max HR	90-100% Max HR	All HR Zones
Overall	66.7%	50.3%	49.7%	51.7%
Shooting %	(26/39)	(93/185)	(81/163)	(208/402)
Free Throw %	84.6%	81.3%	61.9%	74.3%
	(11/13)	(39/48)	(26/42)	(78/105)
3 Point %	72.7%	28.3%	40%	38.4%
	(8/11)	(17/60)	(24/60)	(53/138)

Data indicates average shooting % for team calculated from (Made Shots/Total Shots).

Conclusion: Since shooting accuracy declined at higher HR zones, the players could potentially improve shooting accuracy by improving fitness so their HR decreased during competition. However, assuming HR stayed elevated during competition regardless, changes in practice would be key. Altering practice to run game simulations where the athletes HR is high when practicing shooting drills could be a potential strategy. This could help improve their shooting accuracy at the higher HR zones experienced in games. Lastly, since free throw shooting accuracy was lowest when HR was over 90% max, players might improve free throw shooting accuracy by taking their time at the free throw line to allow HR to recover some. This research can be used to alter how teams practice and play to improve performance and allow coaches to make more informed decisions.

The Relationship between Objective and Subjective Markers of Training Stress in NCAA Division I Collegiate Basketball Players

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An athlete's training stress score (TSS) is an objective marker of overall training volume and can be determined by tracking total time spent at specific heart rate (HR) zones. Additionally, an athlete's power factor (PF) or explosive strength is an important marker of performance and can be measured objectively with power testing equipment. While these measures of training stress and performance are important, a coach with limited resources may not have access to the equipment or expertise necessary to measure these variables. On a subjective level, perceived recovery status (PRS) prior to practice and the rating of perceived exertion (RPE) during a practice can be used to measure stress of training. While the relationship between these objective and subjective markers of training stress have been studied in endurance sports, less descriptive data is available for these responses in intermittent, team sports. We decided to base our research on women's basketball athletes due to the lack of studies for this demographic. **Statement of the problem:** To determine the relationship between PRS and PF, PRS and TSS, and PRS and RPE in NCAA Division I female basketball athletes.

Methods/Procedures: Data was collected over several weeks during both the off-season and competition season in 12 NCAA Division I women's basketball players. Prior to practices at the end of the week, their PF was measured by performing a 4-jump test on a jump mat. Increased PF values indicate more explosive strength. The players also indicated their subjective rating of recovery on the PRS index before practice with higher values indicating the player felt more recovered. RPE was measured after each practice as a rating of how hard the player felt practice was with higher values indicating a more stressful practice. Finally, their TSS was calculated for the entire week by measuring their heart rates and time spent in specific HR zones. The relationship between PRS-PF, PRS-TSS, and PRS-RPE was then calculated by Pearson correlations.

Results: Comparing PRS- PF, there was a weak positive correlation ($r = .305$) on average for the team, while seven of the twelve players (58%) had at least a moderately positive correlation ($r > .4$). PRS-TSS displayed a very weak negative correlation ($r = -.077$). PRS-RPE showed a very weak positive relationship ($r = .141$). **Conclusion:** We hypothesized that as the athlete felt more recovered (higher PRS), their explosive strength measured by the jump test would also increase (higher PF). Over half of the players observed could provide an accurate subjective measure of how prepared they were for practice that correlated with their actual explosive strength prior to practice. For these athletes, the PRS might be a useful surrogate to daily power testing. This would allow the coach to adjust practice accordingly without the need for special equipment or additional testing. While examining the other relationships, PRS vs TSS and PRS vs RPE, we did not see a strong relationship in either. This might indicate that quantifying training stress by HR measurement may not be easily replaced by subjective measures.

Associations Between Fundamental Motor Skills and Academic Behavior in Early Childhood

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Purpose: Early years of childhood, ages 3 through 5, are a crucial period for children to develop and practice fundamental motor skills (FMS) to optimize progression of higher-level sport skills, as well as overall cognitive and social development. Recent evidence has recognized the importance of motor competence (i.e., FMS) on adolescents' academic behaviors (Gu et al., 2019). However, there is limited evidence on how FMS correlates to children's academic behavior at an early stage. Therefore, the main purpose of this study was to examine the relationships between FMS (locomotor and ball skills) and academic behavior as assessed by Strength and Discussion Questionnaires (SDQ) among children between 3 to 5 years old. The gender differences were also explored.

Methods: A cross-sectional research design was applied in this study. Participants consisted of 36 children between 3 to 5 years old (20 boys; 16 girls, $M_{age} = 54.46 \pm 8.47$ months) recruited from a local daycare center. The Test of Gross Motor Development Third Edition (TGMD-3; Ulrich et al., 2019) was administered to assess the FMS including six locomotor skills (e.g., hopping, running) and seven ball skills (e.g., kicking, dribbling). Academic behavior was assessed using the teacher report version of the Strength and Difficulties Questionnaires (TC-SDQ; Goodman, 1997). The SDQ is divided into 5 subscales: 1) emotional symptoms, 2) conduct problems, 3) hyperactivity scale, 4) peer problems, and 5) prosocial behavior. Higher scores indicated the higher risk of behavioral problems. Descriptive statistics, independent t-test, and Pearson's r correlational analysis were conducted.

Results: The studied children demonstrated relatively low level of locomotor skills ($M = 13.90 \pm 6.97$, ranges 3.0-31.5) and ball skills ($M = 15.33 \pm 4.68$, ranges 5.0-23.5). The average SDQ_{total} for these participants was 17.50 ($SD = 5.06$). Specifically, the children also demonstrated better performance in peer problems ($M = 2.08 \pm 1.61$), conduct problems ($M = 2.51 \pm 2.35$), and emotional symptoms ($M = 1.12 \pm 1.23$) compared to other subscales such as hyperactivity scale ($M = 4.65 \pm 3.29$) and prosocial behavior ($M = 7.20 \pm 2.24$). No gender differences were observed on FMS and academic behavior in this study sample ($p > 0.05$). The correlation results revealed that locomotor skills were significantly associated with SDQ_{total} and each subscale (ranges from 0.43 to -0.63, $p < 0.05$) except emotional symptoms. Ball skills, however, was only significantly associated with emotional symptoms ($r = -0.42$, $p < 0.05$) among SDQ subscales.

Conclusions: The findings indicated less skilled children may have higher risk of behavioral and social vulnerability in early childhood, compared to skillful children. Developing children's FMS competence, especially locomotor skills, could be the potential strategy to promote academic behaviors (i.e., hyperactivity and prosocial behavior) in young boys and girls.

Health-Related Fitness Self-Testing in College Students

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Statement of the Problem: Fitness testing has a number of lasting problematic issues (e.g., repetitive use of testing items, lack of privacy, time-consuming test implementation, etc.), leading to the negative attitudes toward fitness testing and low motivation in participating in fitness testing among students. Although a number of studies have identified the aforementioned issues existed in fitness testing, effective methods in solving the long-lasting problems still remain to be seen. This study attempts to solve some of the issues of fitness testing by using fitness self-testing.

Methods: IRB approval was secured before any data was collected. Qualitative document analysis method was applied in this study. Three participants (i.e., freshmen, $N_{female} = 2$, $N_{male} = 1$) were recruited and they were without background in physical education, attending an undergraduate course (i.e., Fitness for Life) at a large southern state university in the U.S. in Spring, 2018. Participants' logs of their fitness self-testing information were the data sources for the study.

Procedures and data collection: According to McMillan and Hearn (2008), self-assessment includes two main activities: (a) monitor and evaluate the quality of thinking and behavior; and (b) identify strategies that improve understanding and skills. Based on the two main components of self-assessment, participants were asked to self-test their health-related fitness outside of class biweekly. In addition, participants were required to record their testing information (e.g., testing dates, testing items and methods, testing results, strategies for improvement, and reflections on self-testing) using a pre-designed online google excel log. To ensure the confidential results, each participant was provided an individual log link for recording his/her own information. Written reflections were done at the end of the semester. Two researchers independently coded and analyzed the data using constant content comparison approach. Peer debriefing was used to ensure the credibility of the data and results interpreted.

Results: Instead of simply using Fitnessgram test items, participants employed their own testing items to simplify their self-testing fitness. Specifically, participants selected multiple testing methods to assess different health-related fitness components (e.g., using 1 minute plank challenge to assess muscular endurance; standing and touching toes to assess flexibility, etc.). Regarding participants' reflections on self-testing their fitness, two themes emerged: (a) self-testing would hold them accountable in monitoring their own health-related fitness, and therefore, they could maintain a healthier lifestyle through progressive fitness self-testing (e.g., be more conscious of their physical activity, eating habits, and sleep behavior). And (b) strategies for improving their fitness were selected based on their own interests in physical activities and study schedule. Participants were able to identify suitable strategies for their improvement such as more stretching exercise, and more muscular endurance activities to improve Body Mass Index (BMI). However, the common strategy they used was increasing the frequency of participating in daily physical activity.

Conclusions: Fitness self-testing presented a possible way in solving some of the long-lasting issues of fitness testing in college students in this study. More importantly, through self-testing, students learned to be responsible for evaluating and monitoring their own fitness, which in return, could enhance students' knowledge and skills toward fitness testing. Self-assessing fitness may have the potential to help college students be physically fit for life.

Strategies in Improving Youth Physical Fitness in Japan
---Comprehensive Intervention Strategies Based on Family, School and
Community

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Statement of Purpose: Physical fitness of Japanese youth has been declining since 1985. Strategies in improving youth physical fitness are urgently needed due to the critical role of youth in economic development in the future. This study aimed to explore the strategies that have been used to deal with the decline of youth physical fitness in Japan.

Methods: Qualitative document analysis was applied to this study. The *Handbook of Promoting Youth Physical Fitness in Japan*, which was downloaded from the website of Japan Sports Agency, was used as the data source. Constant content comparison approach was employed to interpret the document and generate themes in this study.

Procedures: Three researchers translated, coded, and analyzed the handbook. The coding and analysis process mainly focused on three aspects: (a) 3-year (i.e., 2012-2014) physical fitness testing results of Japanese students; (b) a questionnaire survey of students' physical activity and living habits; and (c) cases of schools with excellent students' physical fitness. Comprehensive intervention strategies based on family, school and community was used as the theoretical framework. Peer debriefing was used to ensure the credibility of the data and results interpreted.

Results: The comprehensive intervention in Japan has achieved remarkable results in improving youth physical fitness. Through the analysis of the handbook, three themes emerged: (a) Family-school integration strategy. Parents were encouraged to involve in children's daily physical activity and their participations in sports. In addition, Parents and Teachers Association (PTA) was established to achieve the cooperation between family and school in improving children's physical fitness. (b) School-community integration strategy. The engagement of community organizations was another important part of promotion strategies in Japan. Specifically, schools applied different sports and activities from communities to motivate students' participation in physical activity, and therefore, improving students' physical fitness. And (c) School-school integration strategy. The cooperation between universities (e.g., physical fitness test, research, and physical education classes in higher education) and K-12 school physical education programs has been the main content of this strategy.

Conclusions: The comprehensive intervention strategies based on family, school, and community in Japan has the potential in improving youth physical fitness. For physical educators and researchers, we should not only focus on the role of school physical education programs in promoting physical activity and improving youth physical fitness, family and community should also be the indispensable factors.

Assessing the Neuropsychological Cognitive Function among Preschoolers: A Pilot Study

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INTRODUCTION: The early development of children establishes the instrumental foundation and develops the functionality of the brain, which can affect later stages of human development (Mustard, 2010). Cognitive function refers to the processes of problem solving, from the simplest to the most complex tasks, and encompasses memory, attention and reasoning to develop knowledge and skills useful for daily living (Shatil, 2013). The Cambridge Neuropsychological Test Automated Battery (CANTAB) are computerized assessments that measure functional changes in neuropsychological processing, reaction and execution functions. The CANTAB assessments are suggested an effective approach for understanding individuals' cognitive functions and evaluating the effects of interventions designed to improve neuromotor functioning. The purposes of this study were 1) to explore the feasibility of using the CANTAB test to assess cognitive function among children in the 3-5 age range and 2) to explore the gender differences of cognitive function.

METHODS: A total of 19 preschool children (8 boys, 11 girls; Mean age = 57.47 months, SD = 6.31 months) completed the CANTAB reaction time battery using a standard tablet. The computerized CANTAB reaction time test provides assessments of motor and mental response speeds, as well as measures of movement time, reaction time, response accuracy and impulsivity. Each child performed two assessments - the Single-Choice Reaction Time (SCRT) and the Five-Choice Reaction Time (FCRT) assessing their reaction time and movement time. Descriptive analysis (mean, standard deviation, etc.), independent t-test, and Pearson correlation analysis were used to analyse the data.

RESULTS: The average children's performance on the SCRT was 250.3 m sec (SD=67.3) for movement time and 247.3 m sec (SD=102.9) for reaction time. The results for the FCRT were 275.6 m sec (SD=61.8) for movement time and 268.8 m sec (SD=88.8). No correlation was shown between the reaction time with movement time in both assessments (SCRT & FCRT) while a moderately strong correlation was shown between reaction times ($r=.73$) and between movement times ($r=.67$). The independent t-test revealed no gender differences in reaction time and movement time for both FCRT and SCRT trials. Boys had a better performance than girls on the reaction time for both the SCRT (233.3 m sec vs. 263.3 m sec) and FCRT (263.5 m sec vs. 272.5 m sec). With regards to the movement time, girls outperformed the boys on both the SCRT (243.4 m sec vs. 259.9 m sec) and FCRT (268.4 m sec vs. 285.7 m sec).

CONCLUSIONS: This pilot study indicates the usefulness and feasibility of the CANTAB test to assess domains of cognitive function, specifically reaction time and movement time, among preschoolers. Aligned with previous studies (Magill, 2014), there is no association between reaction time (cognitive process) and movement time (behavioral process). Overall, the children performed better when faced with only a single choice rather than five choices, which is aligned with Wang & Ruhe's (2006) decision making model. Early evaluation of neuromotor status, both cognitive and motor function, may be a valuable approach for monitoring young children's development.

Comparison of Teen Birth Rates to Median Income, Total Birth Rates, and Various Federal Funding Initiatives Between the Years 2012-2018 of Texas.

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Statement of the problem: Teen birth rates have reported to be declining since 1991, approximately dropping 57% from 2000 to 2016 (Mathews & Hamilton, 2018). Although viewed as progress, the United States teen birth rate is still drastically higher when compared to other industrialized countries, and research indicates demographics and socioeconomic status play a large part in the teen birth rate (Kearney & Levine, 2015; Yang & Gaydos, 2010). Common societal beliefs include an increase of government funds/taxpayer dollars for programs such as Medicaid, Women, Infants, and Children (WIC), Supplemental Nutrition Assistance Program (SNAP), etc..., may be due to the country's high teen birth rate. The purpose of this study is to review state and government costs for each program for the state of Texas between the years 2012-2018; teen birth rate, total birth rate, median income and population as well as look into amount of federal funding Texas received of abstinence only or comprehensive sex programs to see if there is a relationship.

Methods: Secondary data from the years 2012-2018 was collected from the following public information. State government data was gathered from the Texas Health and Human Services on population (2012-2018), National Vital Statistics Report for total and teen birth rates (2012-2017), Food and Nutrition Service State Activity Report for SNAP benefits (2012-2016), Statistical Enrollment Data from the Center for Medicaid and CHIP Services (2013-2018), American Community Survey Briefs for median income (2012-2017), Sexuality Information and Education Council of the United States (2012-2018) and WIC data (2013-2017). Teen birth rates were compared to median income, total birth rate, state population, Medicaid, CHIP, individual and household SNAP amounts, WIC, federal funding of comprehensive sexual education and abstinence-only education. Statistical analysis of all factors relating to teen birth rates was explored with a Stepwise Regression model.

Procedures: The variables were compared using a Least Absolute Shrinkage and Selection Operator (LASSO) Stepwise Regression model, with Teen Birth Rate as the dependent variable, to institute a more conservative application of statistical significance.

Results & Summary of findings. Only Population demonstrated a statistical significance ($p=.003, R^2=.992$) with a negative correlation ($r=-.997$). However, while not statistically significant, notable correlative trends were found between WIC ($r=.997$) and Median Income ($r=.982$) when compared to Teen Birth Rates. Limitations for the study was the restricted access to so few years of data, creating correlations with larger relationships and a higher variance than is reliable for recommendations in public policy.

Physical Education Teacher Education Student Beliefs Concerning Appropriate Practices: A Qualitative Approach

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Statement of the problem: Inappropriate instructional practices are a common occurrence for many students in physical education (PE) class and can negatively affect their learning in PE. As pre-professionals, physical education teacher education (PETE) students have the potential to curb the inclusion of inappropriate PE practices when they enter the field. The purpose of this study was to investigate PETE students' beliefs of certain inappropriate practices that have been implemented in PE games and activities. **Methods and Procedures:** Participants ($N = 30$) were undergraduate PETE students at a university in the Western region of the United States who responded to a survey created by one of the researchers. The survey instrument consisted of nine statements reflecting inappropriate practices commonly observed in PE classes. Participants discussed why they felt each statement was appropriate or not, supporting their responses with any experiences that they had in PE as a K-12 student. **Results:** Data were analyzed qualitatively. Responses to each of the nine survey statements were correlated and reviewed to generate coding categories. Themes that emerged from participants' responses ranged from agreement/support for the inappropriate PE practices to disagreement/disapproval. Responses to each survey statement are further examined. **Summary of Findings:** Of concern, a majority of PETE students (97%) agreed that relays, dodgeball, and elimination tag were appropriate activities for PE class; 93% felt that dress, attendance, and effort should be graded as a portion of a student's grade; and 63% thought it was appropriate for PE teachers to use large groups. When examining practices that were misidentified as appropriate, it was noted that participants had been exposed to them as K-12 PE students. This study underscores the importance of PETE faculty instructing majors on appropriate and inappropriate practices in their content area.

Middle school students' intrinsic motivation in team sports

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The level of K-12 students' motivation has declined toward physical education due to the lack of effective teaching practices, inappropriate class activities and gender inequity. The purpose of this study was to examine differences of middle school students' perception regarding intrinsic motivation on team sports.

Participants for this study were three middle schools located in south western in the United States. The total of 262 students were participated in this study. The Intrinsic Motivation Inventory (IMI) developed by McAuley, Duncan and Tammen (1989) was used to measure the level of students' motivation in team sports. The study was approved by the University Institutional Review Board.

Three middle school physical education teachers were contacted and agreed to participate in this study. The principal investigator communicated with the teachers before conducting the study and obtained their lesson schedules. Each teacher had planned to teach one of the team sports such as basketball, volleyball, soccer, and kickball approximately two weeks. The lesson included tactical instruction, skill practice, a variety of drills, and games. The entire period of the team sports was between two and three weeks. Students completed the survey after performing one of the team sports. Answers from participants reflected on their level of intrinsic motivation in team sports.

The result indicated that overall intrinsic motivation decreased as grade level increased. Specifically, means for Enjoyment, 6th grade students (M = 5.53, SD = 1.10) showed higher mean score than 7th grade students (M = 4.96, SD = 1.20) and 8th grade students (M = 4.92, SD = 1.19). In terms of Effort, 6th grade students (M = 5.64, SD = 0.85) showed higher mean score than 7th grade students (M = 5.27, SD = 0.99) and 8th grade students (M = 5.00, SD = 1.06). 6th grade students (M = 5.67, SD = 1.03) showed higher mean score than 7th grade students (M = 5.26, SD = 1.13) and 8th grade students (M = 5.31, SD = 1.11) on Tension and Pressure. However, no statistically different significance found in regards to students' competence. In terms of gender difference, the T-test revealed that male students (M = 5.29, SD = 1.16) showed higher mean score than female students (M = 4.96, SD = 1.21) regarding enjoyment, and male students (M = 5.43, SD = 0.98) showed higher mean score than female students (M = 5.43, SD = 0.98) in terms of effort. However, no statistical significance found in regards to competence and tension and pressure.

This research provides some meaningful implications for physical educators. First, as the research has shown, higher level grade students are less likely to motivate in team sports. Given the result, teaching team sports can be a part of the lesson; however, it is necessary for physical educators to embrace a wide range of activities in their lessons. A prime objective of middle school physical education is to augment students' knowledge, develop their fitness, and teach or refine motor skills applicable to a wide range of sports and physical activities such as individual, team, and outdoor sports, invasion games, dance, and fitness (NASPE, 2004).

Implementing Service Learning Components into the Undergraduate Adapted Physical Education Course

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STATEMENT OF THE PROBLEM: The number of students with disabilities received special education (SPED) has been increased over the past 20 years. Currently, 7 million students with disabilities are receiving SPED (National Center for Education Statistics, 2019). Since several studies indicated that many general physical education teachers do not feel prepared to teach students with disabilities (Ammah & Hodge, 2005; Vickerman & Coates, 2009), it was questioned whether undergraduate physical education teacher education (PETE) program are providing enough information and hands-on experiences to prepare pre-service physical education (PE) teachers. As success of inclusion may well depend upon the prevailing attitudes of teachers as they interact with students with disabilities (Carroll, Forlin, & Jobling, 2003), different types of instructional components were proposed to be implemented into PETE curriculum for positive attitudes of pre-service teachers toward people with disabilities (Kwon, 2018). The purpose of this study is to investigate whether the Service Learning (SL) components in undergraduate adapted physical education course would have an impact on the behavior of pre-service PE teachers toward people with disabilities. **METHODS:** The components of SL were identified and developed based on the 8-Block Model inviting the local community center for people with disabilities and the disabled sports organizations to provide capacity, assessment and reflection. The major component of SL were completing volunteer work for 6 hours total at two different locations, the disabled physical activity program and the disabled sports practice. These components were implemented into EDKN 4xxx Motor Skills for Special Population, a required course for pre-service PE teachers. An instrument, Multidimensional Attitudes Scale toward Persons with Disabilities (MAS) (Findler, Vilchinsky & Werner, 2007), was given to all participants twice at the beginning and end of the semester to measure participants' level of affect, cognition, and behavior toward people with disabilities. **RESULT:** Total 70 pre-service teachers ($N=70$) were participated into the study. The ages of participants were $M=22.23$, $SD=2.757$. t -test were conducted to reveal the difference in scores of MAS at the beginning and end of the semester. The result showed significant higher scores in overall MAS from pre-test ($Mean_{pre}=43.171$, $SD_{pre}=11.245$) to post-test $Mean_{post}=63.202$, $SD_{post}=6.243$; $t(70)=7.307$, $p<.000$). Specifically, scores in affect has been significantly increased from pre-test ($Mean_{pre}=15.234$, $SD_{pre}=3.242$, $Mean_{post}=19.769$, $SD_{post}=5.443$; $t(70)= 2.676$, $p <.000$) to post-test, scores in cognition increased significantly from ($Mean_{pre}=13.595$, $SD_{pre}=1.29$) to ($Mean_{post}=22.129$, $SD_{post}=3.256$; $t(70)= 4.584$, $p <.000$), and behavior increased from ($Mean_{pre}=14.342$, $SD_{pre}=1.292$) to ($Mean_{post}=21.304$, $SD_{post}=2.319$; $t(70)= 8.241$ $p <.000$). **CONCLUSION:** Since pre-service teachers' acquired positive attitudes towards people with disabilities could be one of the key factors for successful inclusion (Sharma, & Earle, 2009; Kim, 2011), PETE programs need to be designed to provide different types hands-on experiences in practical settings throughout the program. Data from this study revealed that implementing SL components could increase pre-service teachers' attitude toward people with disabilities. This study makes a case for implementing SL components as one of the essential experiences in PETE programs, as this can increase level of preparedness of the pre-service teachers toward including students with disabilities. **SUMMARY:** Based on the current findings, implementing SL components, volunteer experience, in undergraduate adapted physical education course improve pre-service teachers' positive attitude toward people with disabilities.

Awareness of Fat Soluble Vitamins Toxicity and Its Consumption Pattern among Medical Students

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Abstract:

Background: Dietary supplements (DS) are popular in many countries and their use has been increasing. In the editorial of *Annals of Internal Medicine* (2013), Guallar *et al.* suggested that there is no convincing evidence that multivitamins provide any substantial health benefit in well-nourished adults. The American Association of Poison Control Centers in 2017 reported 59,761 serious exposure instances (2.33% of total toxicities) of vitamins. Information on DS/ Multivitamins from a variety of media sources is widely available, but the information is often contradictory and confusing.

Hypothesis: Insufficient reliable data are available on multivitamin usage and the knowledge of over consumption related to adverse effect by sub-populations, such as youths. Since students share a variety of characteristics and similar lifestyles, their DS use may differ from the general population. The hypothesis is that the nutritional awareness program about the toxicity of fat soluble vitamins can change the consumption pattern of multivitamins.

Methodology: This cross-sectional observational study has conducted from September 2018 to May 2019 among 237 medical students once they completed 1st semester of their medical school using a well-designed questionnaire.

Results: We are astonished to observe that 188 students (79.3%) were taking some form of DS and overall 169 (71.3%) students acknowledged to intake of multivitamins which contains fat soluble vitamins, before admission to medical school. After completion of 1st semester of medical school, 97.5% (231) students said that they are now aware to the toxicity impact of fat soluble vitamin which may be caused due to over consumption. About 68.4% (162) of students said that they are still consuming the multivitamins containing fat soluble vitamins. But the most interesting result we observed that the 82.8% students (140 out of 169) reduced the quantity and frequency towards the intake of fat soluble vitamins.

Conclusion: Medical students likely other youths to use multivitamins, but after awareness about overconsumption related harmful effect, they reduced the intake of fat soluble vitamins. Similarly, if we make the general public aware about overconsumption related harmful effect of fat soluble vitamins, then we may observe the decreased intake and less inpatient due toxicity symptoms.

Movement Screening and Mobility Training in Community College Students

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STATEMENT of the PROBLEM: Movement screening (MS) has become a common evaluation tool for performance populations like elite athletes, first responders, military personnel and others. However, few studies have been conducted that evaluate less fit populations where the loss of mobility (low MS scores) with aging and increased body mass index (BMI) have been identified as primary reasons contributing to future physical inactivity. We have conducted previous pilot studies on students in community college personal fitness and yoga courses, and consistently found that a curriculum focused on developmental/corrective exercise and general resistance training improved functionality measures on a MS for a large percentage of initially low, or moderately fit participants.

PURPOSE: The purpose of this study was to determine if a large sample of community college students (including dual credit high school students) might improve anthropometric/mobility measures pre- and post, following participation in one semester long personal fitness or yoga classes (one semester in years 2017 or 2018). **METHODS:** All subjects (Total N = 335; Females = 234, Males = 106; Total sample age range = 15 - 61 years; Mean Age = 23.25 years for Females and 21.75 for Males; mean Pre-Body Mass Index - BMI = 28.78 for Females and 27.57 for Males) were enrolled in basic personal training fitness or yoga courses and completed simple anthropometric/mobility measures (BMI, waist and hips, girths, shoulder mobility etc.) and an MS battery of five assessments (one measured in inches and four were scored as yes/no for success). Subjects then completed a personal fitness course taught by an instructor who emphasized 15-20 minutes of core and mobility training and 30 minutes of general resistance training per each class session or a traditional yoga course with emphasis on improving mobility. Preliminary data analyses included multivariate (MANOVA) and Chi Square statistical techniques utilizing an aprior alpha level significance of $p < .05$. **RESULTS:** There were statistical significant differences on all five MS assessments over time (pre-/post-) for personal fitness and yoga participants. Subjects as a whole significantly improved left but not right shoulder range of motion (ROM); mean pre-test = 4.18 inches vs. mean post-test = 3.92 inches. The statistically significant mean percentages for the other four MS assessments were as follows: *Toe touch* – 14.9% Fail, 85.1% Pass Pre and 9.2% Fail, 89.8% pass Post; *Push Up* – 38.6% Fail, 61.4% Pass Pre and 26.3% Fail, 73.7% Pass Post; *Right Leg Stance* – 4.2% Fail, 95.8% Pass Pre and 2.5% Fail, 97.5% Pass Post and, *Wall Squat* – 31.5 % Fail, 68.5% Pass Pre and 25.6% Fail, 74.4% Pass Post. **CONCLUSIONS:** Our study results show that completion of a personal fitness course or a yoga course, designed for community college students who were overweight, and moderately low to moderate fit initially, are effective strategies to significantly improve MS scores. By maintaining or improving movement mobility, young adults are more likely to have success at engaging in long term physically active lifestyles and reducing their risks for becoming sedentary, overweight, and/or obese.