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Overturning the Hypothesis that Cigarettes Can Enhance Hematocrit and Improve Aerobic Capacity

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(No relevant relationships reported)

Some athletes are willing to try any supplement or drug to enhance performance. Recent reports suggest cigarette smoking may improve endurance performance by inducing oxidative stress which would, in turn, stimulate an increase in hemoglobin and thus increase oxygen-carrying capacity. It is important to validate these claims, given the hazardous side effects of cigarette smoking.

PURPOSE: Examine the influence of cigarette smoking on blood hemoglobin levels to determine if smoking stimulates training- like conditions for aerobic enhancement.

METHODS: Hemoglobin and oximetry levels were measured in 594 smokers and 1,626 non-smokers across a wide age-range (ages 15 to 98). Independent variables were age, sex, obesity, smoking status, and presence of diabetes, COPD, or other respiratory diseases. Dependent variables were hemoglobin and oximetry. Independent-samples t tests and chi-square tests were used to detect group differences between smokers and non-smokers. Multiple linear regressions were used to isolate the effect of smoking on hemoglobin and oximetry.

RESULTS: Subjects were 52.5 ± 22.5 years of age, 55.7% were male, 16.5% were obese, average hemoglobin was 13.5 ± 1.9 g/dL, and oximetry was 97.0 ± 2.9%. Independent-samples t tests revealed cigarette smokers' hemoglobin levels to be 4.6% higher ($p<0.001$) and oxygen saturation to be 0.3 percentage points higher ($p=0.042$). Cigarette smokers were also 13.5 years older ($p<0.001$) and more likely to be male ($p<0.001$). Age ($p<0.001$) and sex ($p<0.001$) were strongly correlated with hemoglobin. When controlling for all significant confounders, multiple linear regression did not demonstrate a significant effect of cigarette smoking on hemoglobin ($p=0.317$) but it found a reduction of 0.4 percentage points on oximetry ($p=0.005$).

CONCLUSIONS: Simple t-tests indicated cigarettes might confer an ergogenic advantage via elevations in hemoglobin and oximetry. This, left alone, could suggest inadequate oxygen saturation of the blood (owing to smoking) may simulate training-like conditions. However, the predominant explanatory variables were age and sex. It is not the smoking, but other subject factors of the person who smokes that influences hemoglobin levels. Controlling for confounders, smoking has no effect on hemoglobin and reduced oxygen saturation.

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The Association Between Physical Activity, Sleep, and Cardiovascular Risk Factors in College Students

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(No relevant relationships reported)

Physical activity can help improve traditional cardiovascular risk factors, including blood pressure and body composition (Archer and Blair, 2011). In addition to the traditional cardiovascular risk factors, sleep has started to emerge as an important component to overall and cardiovascular health (Grandner et al., 2014). Low levels of sleep have been shown to negatively impact a host of cardiovascular risk factors, including blood pressure, blood lipids, markers of inflammation, and body fatness. (Carnethon et al., 2016)

PURPOSE: The purpose of this study was to examine the associations between physical activity and sleep with blood pressure and waist circumference in college- age adults.

METHODS: A total of 57 Albion College students (23 males, 34 females) participated. Height, weight, waist circumference, and blood pressure were measured. Physical activity was self-reported and sleep was assessed with The Pittsburgh Sleep Quality Index. Multiple regression was used to assess the purpose.

RESULTS: 47.4% of participants were physically active five or more days per week, while 38.5% of participants averaged eight or more hours of sleep per night. 8.8% had a waist circumference categorized as high and 5.2% of participants were pre-hypertensive. 52.6% of the total participants were athletes, with 48% of those currently in-season. There was a significant interaction between physical activity and total hours of sleep on systolic blood pressure ($p=0.035$, $R^2 = 0.117$) and waist circumference ($p=0.023$, $R^2=0.13$). Total hours of sleep had a significant unique contribution to the model ($\beta=-0.364$, $p=0.007$) when examining waist circumference, while physical activity had a significant unique contribution to the model ($\beta=-0.264$, $p=0.050$) when examining systolic blood pressure.

CONCLUSIONS: The importance of being physically active and getting the proper amount of sleep should to be stressed to college students as this can impact their cardiovascular health at a young age. Additionally, discussing the development of cardiovascular risk factors needs to start with this age group, as some participants were noted as being pre-hypertensive or having a high waist circumference. Since this was a very active sample, additional studies need to examine these relationships with a wider variety of college students.

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The Association of Body Composition with Cardiometabolic Risk Factors in Apparently Healthy Young Adult Females

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(No relevant relationships reported)

Although risk factors associated with cardiometabolic diseases (CMD) such as excess adiposity are oftentimes detected in young adults, most of the research examining these relationships has focused on middle-aged and older adults and those "at-risk" for chronic diseases. Given the U.S. trend of increased obesity prevalence with age and the high prevalence of metabolic abnormalities in normal-weight young adult females, understanding the link between body composition and CMD risk in healthy young females is important for developing intervention strategies for primary prevention of obesity and CMD diseases.

PURPOSE: Therefore, the purpose of this study was to examine the associations of body composition with CMD risk factors in apparently healthy young adult females.

METHODS: Twenty-five non-obese [body mass index (BMI) < 30 kg/ m^2] apparently healthy females (22.6 ± 4.2 years) took part in this cross-sectional study. All participants had height, weight, waist circumference (WC), body composition using Dual-energy X-ray Absorptiometry, resting heart rate (HR), blood pressure, and fasting biomarkers assessed. Bivariate correlations using Spearman's rho were used to examine the relationships of CMD risk factors with anthropometric obesity indices and body composition. Significance was set a priori at $P \leq 0.05$.

RESULTS: Significant associations were found between waist-to-height ratio (WHtR) and resting HR (Spearman's $\rho = 0.436$, $P = 0.03$), cholesterol ($\rho = 0.404$, $P = 0.04$), low-density lipoprotein cholesterol (LDL-C) ($\rho = 0.475$, $P = 0.02$), and glucose ($\rho = 0.485$, $P = 0.01$); BMI and resting HR ($\rho = 0.41$, $P = 0.04$), cholesterol ($\rho = 0.437$, $P = 0.03$), and LDL-C ($\rho = 0.477$, $P = 0.02$); total body fat percentage and resting HR ($\rho = 0.636$, $P = 0.001$); bone mineral content and glucose ($\rho = -0.536$, $P = 0.007$); and lean mass and glucose ($\rho = -0.461$, $P = 0.02$). WC was not significantly associated with any of the CMD risk factors.

CONCLUSION: While WHtR was correlated with more CMD risk factors than other measures of body composition, the strongest correlation was found between total body fat percentage and resting heart rate. These data suggests that body composition may play an important role in cardiometabolic health in young adult females even when classified as apparently healthy and non-obese.