



UNIVERSITY OF  
ARKANSAS

# THE RELATIONSHIP BETWEEN GLUCOSE LEVELS AND PHYSICAL ACTIVITY

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## INTRODUCTION

- Elevated glucose levels can increase the risk for disease
- Physical activity behaviors are associated with glucose levels
- Limited research on young adults and their glucose levels compared to activity

## OBJECTIVES

- To complete a cross sectional study and determine associations between fasting glucose with physical activity, and fitness

## HYPOTHESES

- More physical activity and higher fitness, will result in a lower, normalized glucose level

## METHODS

- 26 Participants aged 18-25
- Measures: 8-hour fasted glucose measurement, and treadmill testing
- A GT9X accelerometer measured the participants' 24-hours, 7 days of activity
- Glucose levels were compared to VO<sub>2</sub> max, maximum rate of oxygen consumption, from the treadmill test and to their weekly vector magnitude and step counts to determine physical activity.
- Statistical analysis: the relationship between fitness and physical activity with blood glucose was assessed using linear regression, additionally adjusted for age, sex, and BMI.

### Fitness Assessment Measures



Bruce Protocol  
Treadmill Test  
(ml/kg/min)

## RESULTS

**Table 1: Sample Descriptives**

	Men	Women	p-value comparing
Age years	21.3	21.2	.835
Height inches	70.7	65.3	<.001
Weight pounds	182.8	147.5	.005
BMI lb/in <sup>2</sup>	25.7	24.2	.320
Fasting blood glucose mg/dL	100.0	88.4	.041
VO <sub>2</sub> ml.kg/min	42.7	36.0	.007
Physical Activity (CPM)	2080.4	1922.2	.333
Step Count	11,494.5	11,846.2	.764

- In unadjusted models, VO<sub>2</sub>max was positively associated with blood glucose (p=0.039)
- Step count was negatively associated with blood glucose (p=0.02)
- When adjusted for age, sex, and BMI, VO<sub>2</sub>max was not statistically associated with blood glucose (p=0.668), but step count remained negatively associated

**Table 2: Associations between physical activity and blood glucose unadjusted**

	Estimate (β)	Standard Error	95%CI	p-value
VO <sub>2</sub>	0.9	0.4	0.05, 1.7	0.039
Physical Activity (CPM)	0.002	0.007	-0.01, 0.02	0.716
Step Count	-0.002	0.001	-0.004, -0.0004	0.02

**Table 3: Associations between physical activity and blood glucose adjusted for age, sex, BMI**

	Estimate (β)	Standard Error	95%CI	p-value
VO <sub>2</sub>	0.2	0.5	-0.9, 1.3	0.668
Physical Activity (CPM)	0.01	0.01	-0.01, 0.02	0.434
Step Count	-0.002	0.001	-0.003, -0.0001	0.038

## DISCUSSION

- Overall findings:
  - Higher step count → lower blood glucose
  - Higher VO<sub>2</sub> max → higher blood glucose
- Mechanisms:
  - Relationship between fitness and physical activity with blood glucose was assessed using linear regression, additionally adjusted for age, sex, and BMI
- Limitations of study:
  - Lack of compliance with fasting from participants
  - Small population size
- Strengths of study:
  - Obtaining fasted blood samples
  - Successfully administering the fitness assessments
  - Analyzing the accelerometer data
- Future studies:
  - Monitor blood glucose levels before and after amounts of exercise

## CONCLUSIONS

- Proven hypothesis of higher physical activity associated with lower blood glucose.
- Increase in weekly steps could improve overall health
- Disproved hypothesis of higher fitness associated with lower blood glucose
- This study was important to determine associations between fasting glucose with physical activity and fitness.
- This study also helped by promoting glucose test screening to young individuals.

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## CONTACT INFORMATION

Website: [exerciseismedicine.uark.edu](http://exerciseismedicine.uark.edu)

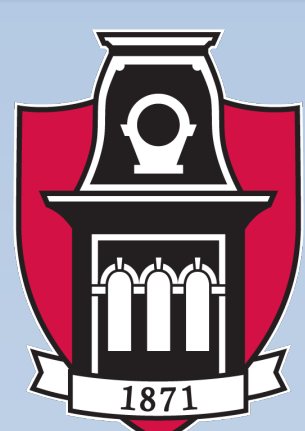
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