

# Associations between First Year Medical Students' Lifestyle, Resting Blood Pressure, and Resting ECG

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## INTRODUCTION

There is considerable evidence that psychological stressors can impact cardiovascular health. Medical students experience a high degree of stress based upon their responses to survey questionnaires, although there are few physiological studies that support this association that are targeted specifically to medical students. Medical students in general represent an underrepresented age group in the context of cardiovascular treatment guidelines. Thus, between lack of age group guideline and cardiovascular association with mental health, medical students are a pertinent cohort for study.

## OBJECTIVE

The purpose of this study was to analyze if medical student lifestyles facilitated changes from their normal baseline cardiovascular measurements of blood pressures and electrocardiograms.

## METHOD

Twenty five Medical students in the Philadelphia College of Osteopathic Medicine graduating class of 2017 were recruited and met inclusion criteria. Blood pressure and lifestyle factor surveys were obtained on a weekly basis and ECGs were recorded biweekly. All ECGs were read by a cardiologist. Participation by the cardiologist and the subjects was voluntary and without compensation. BP and Heart Rate data were statistically analyzed using ANOVA and the ECG analyses using Fisher Exact Test. Data obtained throughout the study was compared to the subjects' initial data gathered at the beginning of the academic year. Data was organized into the male gender category, the female gender category, and a category that combined the data for both genders.

Philadelphia College of Osteopathic Medicine graduating class of 2017 participants	
Male	12
Female	13
Combined	25

## Methods Continued

### Lifestyle Parameters

1. Aerobic Exercise
2. Alcohol
3. Anxiety
4. Caffeine Consumption
5. Health Issue
6. Group Study or Alone Study
7. Sleep
8. Strength Exercise
9. Study Hours (not including class hours)

### Blood Pressure

Blood Pressure Category	Systolic mm Hg (upper #)		Diastolic mm Hg (lower #)
Normal	less than 120	and	less than 80
Prehypertension	120 – 139	or	80 – 89
High Blood Pressure (Hypertension) Stage 1	140 – 159	or	90 – 99
High Blood Pressure (Hypertension) Stage 2	160 or higher	or	100 or higher
Hypertensive Crisis (Emergency care needed)	Higher than 180	or	Higher than 110

### Heart Rate

Heart Rate Category	Heart Rate (beats/minute)
Bradycardia	<60
Normocardia	60-100
Tachycardia	>100

### Electrocardiograms

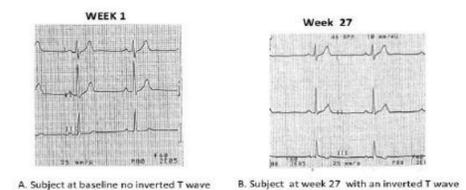
1. Premature Atrial Contraction (PAC)
2. Premature Ventricular contraction (PVC)
3. Early Repolarization (ER)
4. Primary AV Block or 1° AVB (PR Interval abnormality)
5. Voltage Criteria for LVH (VLVH)
6. Poor R Wave Progression (PRWP)
7. Inverted T Wave
8. Axis Deviation
9. QRS Interval
10. QT interval

## Results and Discussion

Of the nine lifestyle factors the ones that displayed a **significant difference or trended toward significance** when compared to the CV parameters measured:

- **Aerobic** → systolic abn (combined genders  $p < 0.07$ ), ECG anomalies: inverted T wave (combined genders  $p < 0.03$ )
- **Anxiety** → ECG anomalies: voltage criteria for LVH (combined genders  $p < 0.05$ )
- **Caffeine** → systolic abn (male  $p < 0.05$ , female  $p < 0.07$ )
- **Group Study** → Bradycardia (female  $p < 0.01$ )
- **Health** → ECG anomalies: inverted T wave (combined genders  $p < 0.01$ )
- **Strength Exercise** → systolic abn (combined genders  $p < 0.02$ ), diastolic abn (combined genders  $p < 0.004$  and male gender  $p < 0.04$ ), ECG anomalies: Early Repolarization (female  $p < 0.01$ )
- **Study Hours** → diastolic abn (female  $p < 0.09$ ), Bradycardia (combined genders  $p = 0.034$ , female  $p < 0.04$ ) ECG anomalies: inverted T wave (both genders  $p < 0.0083$ , females  $p < 0.10$ )

**NOTE: Alcohol and Sleep are not mentioned in this presentation because no significance differences were found for those lifestyle factors in this cohort**



## Conclusion

There were changes demonstrated in both blood pressure and ECGs demonstrated in association with both behavioral and curriculum lifestyle factors. Whether the behavioral habits that differed significantly from baseline were due to the curriculum cannot be determined from these preliminary analyses. However, these findings in this population are concerning with respect to younger adults as a discrete and unique population that may warrant closer scrutiny by the American Heart Association to determine whether a new category of recommendations for younger adults may be warranted with respect to blood pressure and heart rate parameters.

## REFERENCES

Upon request

## ACKNOWLEDGEMENTS

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