

# Using Cluster Analysis to Identify Subgroups of College Students at Increased Risk for Cardiovascular Disease

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# DISCLOSURES

## Conflict of Interest

- ❖ Dieu-My Tran(Content expert and speaker) reports no conflict of interest.
- ❖ Kevin Kupyzk and Lani Zimmerman(Co-authors) report no conflict of interest.

# OBJECTIVES

Upon completion of this presentation, participants will be able to:

1. Evaluate college students who are at increased risk for cardiovascular disease.
2. Identify college students who are at increased risk for cardiovascular risk reduction intervention.



# BACKGROUND

- Young adults unrealistic or uninformed about their health and eating habits.
- 1/3 of this population is unaware of risk
- Plaque formation begins in young adulthood
- Why college students?
  - Similar education background in a common setting
  - Transition from home to college environment
  - Approximately 35% of college students are overweight or obese
  - Vulnerable population to health issues



# PURPOSE

To examine the co-occurrence of cardiovascular risk factors and cluster subgroups of college students, ages 19 to 39, for cardiovascular risks based on socio-demographics, non-modifiable, and modifiable risk factors.

The overall goal is to identify a target group of individuals at increased risk for cardiovascular disease.



# CONCEPTUAL FRAMEWORK

The conceptual models guiding this study were the Health Belief Model and the Information, Motivation and Behavior Skill Model.



# METHODS

**Research Design.** A convenience, cross-sectional, descriptive research study using co-occurrence patterns and hierarchical cluster analysis

**Settings and Recruitment.** University of Nebraska-Lincoln

- University Health Center and Student Union

**Inclusion Criteria:** college students between ages 19 to 39 enrolled at the recruited university and weigh at least 110 pounds

**Exclusion criteria:** diagnosed of CVD such as myocardial infarction, stroke or CHD.



# MEASURES

- Socio-demographics
  - health history
- Biometrics
  - Random blood glucose
  - Lipid panels
  - Height and weight (BMI)
  - Blood pressure
- Risk assessments
  - Lifetime atherosclerotic CVD (ASCVD) risk
  - 30-year CVD risk (Framingham)



# SAMPLE

- 158 participants completed the research for data analysis.
- Average age  $24.33 \pm 4.61$  years old
- Majority were male ( $n=72$ , 54.4%), single ( $n=131$ , 82.9%), and had insurance coverage ( $n=146$ , 93.0%).
- Race/ethnic distribution:
  - White 63.1% ( $n=99$ ) ; Asian/Pacific Islander 13.4% ( $n=21$ )
  - African American 8.3% ( $n=13$ ); Hispanic or Latino 7.6% ( $n=12$ )
  - Native American 1.3% ( $n=2$ ) ; Other 6.4% ( $n=10$ )

# RESULTS

## Non-modifiable and modifiable CV risk factors

### Reported

51 (32.3%) Family history of heart disease  
12 (7.6%) Hypertension  
11 (7.0%) Current smokers  
2 (1.3%) Diabetes

### Measured

71 (44.9%) Overweight/obese  
20 (12.7%) Hypertension  
6 (3.8%) Diabetes  
5 (3.2%) Hyperlipidemia

- Significant differences found in the 10-year and 30-year CV risk assessments between genders
- Family history of heart disease demonstrated a significant differences in the full 30-year CV risk assessment ( $p=0.022$ )
- No differences between White and non-White

# RESULTS

- Average DBP, glucose, total cholesterol, LDL-C, HDL-C, and triglycerides were all within normal range.
- Average SBP in prehypertensive stage (122.9) & Average BMI 25.7
- Average lifetime risk assessment 31.4%, 30-year CVD 4.8% (full) and 2.3% (hard)
- Physical activity most frequently reported were moderate levels ( $n=65$ , 41.1%)
- Most reported being active 3-5 times per week ( $n=81$ , 51.3%)
- Half ( $n=79$ , 50.0%) eat out occasionally (2-3 times per week)
- About 81% of the participants' drink sugary beverages
- 58 (36.7%) reported occasionally eat red meats

# RESULTS

- 75 (47.5%) no CV risk factors
- 57 (36.1%) at least one risk factor
- 22 (13.9%) two risk factors
- 4 (2.5%) three risk factors.

**Total 34 risk factors that co-occurrences, 30 of them involved being overweight/obese.**

## *Co-occurrence of Risk Factors*

	<i>n</i>	% of sample
Overweight & High blood pressure	17	10.76%
Overweight & Smoking	6	3.80%
Overweight & High glucose levels	4	2.53%
Overweight & Elevated lipid levels	3	1.90%
High glucose levels & Blood pressure	2	1.27%
High blood pressure & Smoking	1	0.63%
High glucose levels & Elevated lipid levels	1	0.63%

Note:  $n = 26$  had two or more risk factors.

# RESULTS

## Cluster Analysis Subgroups

	Cluster 1 <i>n</i> =65	Cluster 2 <i>n</i> =5	Cluster 3 <i>n</i> =60	Cluster 4 <i>n</i> =3	Cluster 5 <i>n</i> =16	Cluster 6 <i>n</i> =5	p-value
Gender							<.001
Male	19	5	49	2	7	3	
Female	46	0	11	1	9	2	
Race/Ethnicity							<.001
White	29	4	50	2	9	2	
Non-White	36	1	10	1	7	3	
Marital status							.034
Married/Living together	18	1	4	0	2	0	
Single/Divorced	47	4	56	3	14	5	
Insurance (Yes)	65	5	60	3	6	4	<.001
PMH - Heart Problems (Yes)	0	0	0	3	0	0	<.001
Family Hx of Heart Disease (Yes)	19	2	22	1	3	3	0.546
Taking Antihypertensive (Yes)	0	5	0	0	0	0	<.001
High glucose levels (Yes)	0	0	4	0	0	1	0.085
Overweight/Obese (Yes)	8	4	43	2	9	3	<.001
High blood pressure (Yes)	0	3	15	1	1	0	<.001
Elevated lipid levels (Yes)	0	0	0	0	0	5	<.001
Current Smoker (Yes)	0	0	1	0	10	0	<.001
Physical Activity		<i>M</i> =3.6		<i>M</i> =3.33			.037
Eat Out							.047
Drink Sugary Beverages							.154
Eat Red Meat			<i>M</i> =2.9			<i>M</i> =2.4	<.001

Note: PMH Past medical history; Hx history

# CONCLUSIONS

1. College students are a targeted population that could benefit from CV risk reduction since more than 50% of our study population had one or more CV risk factors and should be screened routinely.
2. High risk groups through clustering technique can be used to identify groups of college students to target for interventions.
3. Opportunity for health professional programs in Colleges and Universities to work with health centers and campus administration by instituting risk factors modification programs or events in this population

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