

Perceived Stress and Metabolic Syndrome in Undergraduate Students

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Introduction

Metabolic syndrome (MetS) is characterized by having three or more of the following conditions: hypertension, glucose intolerance, low high-density lipoprotein (HDL) cholesterol, elevated triglycerides (TG), and elevated waist circumference (WC)¹. MetS is related to an increased risk of cardiovascular disease (CVD) and type 2 diabetes mellitus (T2DM)².

There are an estimated 20 million college students in the US³. This population could be in the beginning stages of chronic diseases such as MetS without clinically significant symptoms. College students also experience high levels of stress⁴. Stress has been shown to increase insulin resistance and abdominal adiposity⁵. Identifying modifiable risk factors for MetS may be helpful in reducing the future burden of disease in this population.

Objective

To examine the association between MetS and perceived stress (PS) in participants of the College Health and Assessment Survey (CHANAS).

Methods

Data were collected a between 2012-2018 (n=4077, 70.0% female) as part of the on-going, cross sectional CHANAS study. Obtained informed consent from students enrolled in the introductory nutrition course NUTR 400 (UNH IRB 5524).

Participants

- Students (n=4077, 70.0% female) between the ages of 18 and 24
- Participants that did not complete any portion of the assessments, who are pregnant, or had a medical condition that would prevent full participation were excluded from analyses

Procedures

- PS was measured using Cohen's 10-item Perceived Stress Scale^{6,7} via an online survey
- After a 12 hour fast, biochemical data was collected by using a finger stick and analyzed by the Cholestech LDX analyzer
- Blood pressure was collected in duplicate using a digital blood pressure monitor
- Waist circumference measurements were taken at the natural waist and at the iliac crest in duplicate using a Gulick tape measure

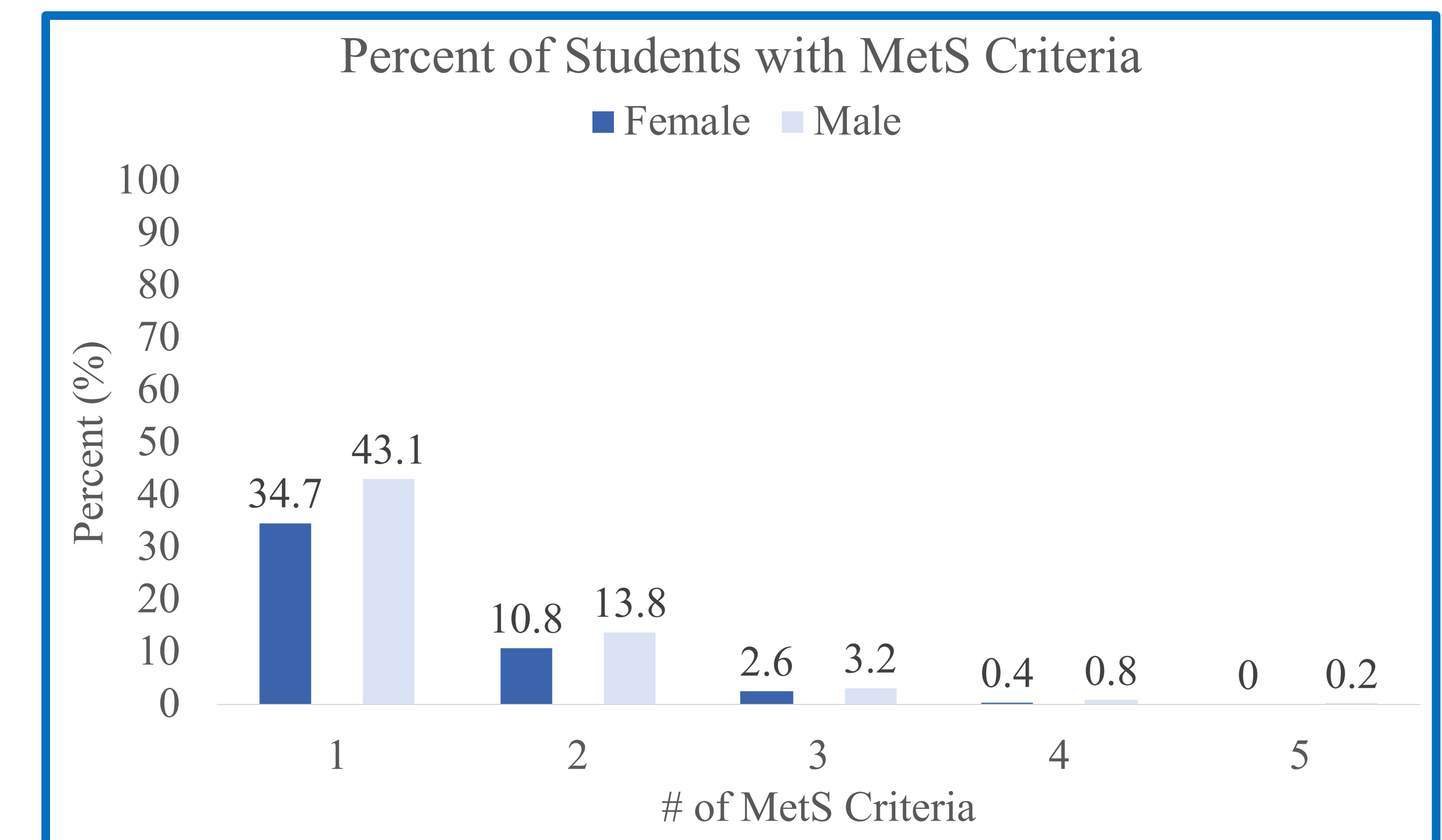
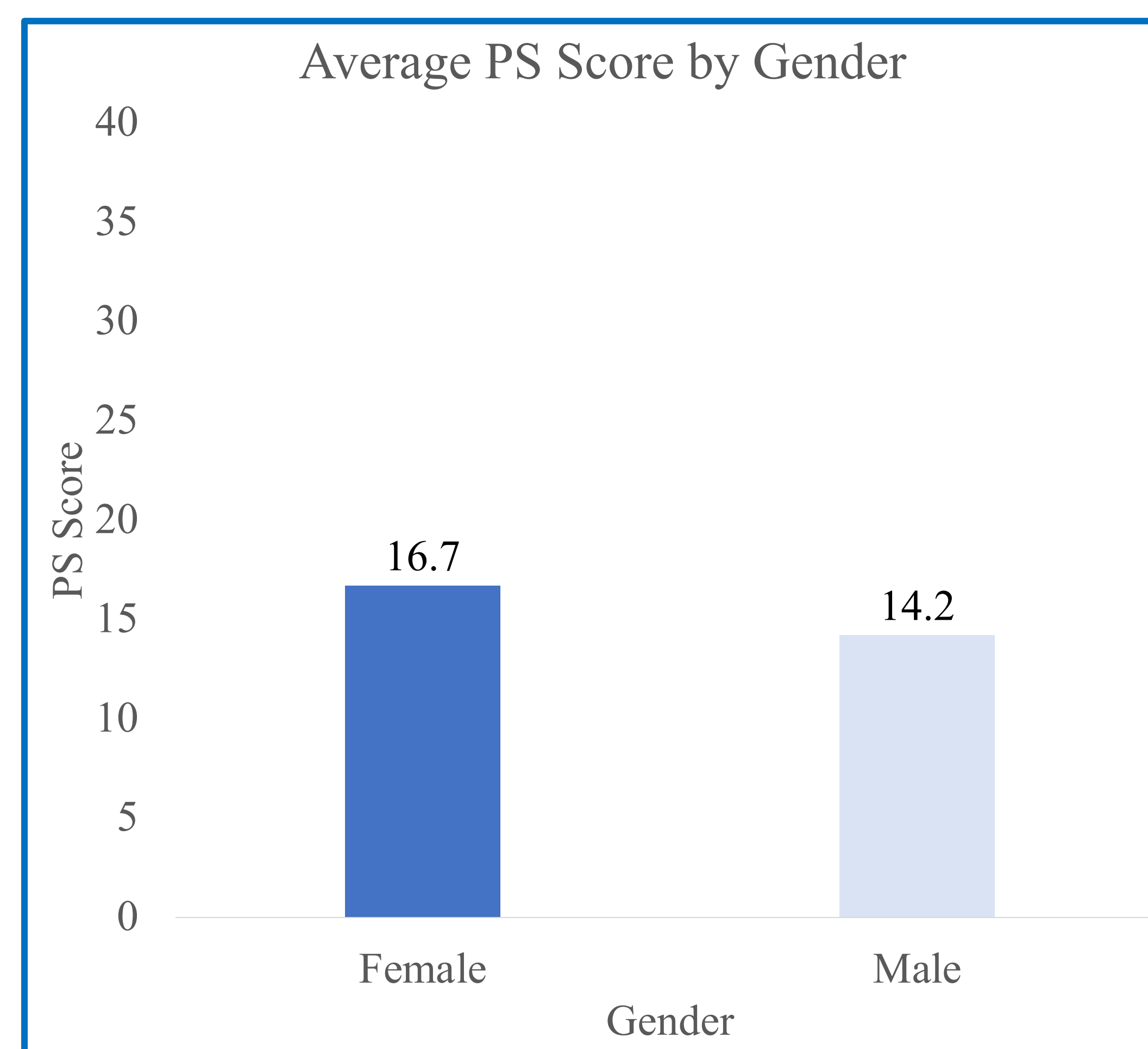
Data Management and Analysis

- PS scores were stratified by gender and categorized into quartiles:
 - Female quartiles: 0-12, 13-17, 18-21, 22-40
 - Male quartiles: 0-9, 10-14, 15-19, 20-40
- ANCOVA was used to examine differences between PS quartiles and all measured MetS parameters (n=3416)
- BMI, smoking status, and steps/day were used in analyses as covariates
- Data are presented as means±SD

Cohen's Perceived Stress Scale^{6,7}

In the last month, how often have you...	
1	Felt upset because of something that happened unexpectedly?
2	Felt that you were unable to control the important things in your life?
3	Felt nervous or stressed?
4	Felt confident about your ability to handle your personal problems?
5	Felt that things were going your way?
6	Found that you could not cope with all the things you had to do?
7	Been able to control irritations in your life?
8	Felt that you were on top of things?
9	Been angered because of things that were outside of your control?
10	Felt difficulties were piling up so high that you could not overcome them?

Never	Almost Never	Sometimes	Fairly Often	Very Often
0	1	2	3	4



Results

- Average PS score was 14.2±6.6 for males
- Average PS score was 16.7±6.6 for females
- Average number of MetS criteria met was 0.71±0.82
- 52.6% of participants had at least 1 criterion for MetS
- No significant group differences in any MetS parameters were observed by PS quartiles for men or women (all $p > .05$)

Conclusion

Our research did not observe a relationship between MetS or any of the individual criteria with PS in a sample of college students. Further research is needed to examine the long-term effects of stress on the development of MetS in the emerging adult population.

Acknowledgments

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