

Relationship Between Mental Health and Physical Health in Rural, Low-Income, High School Students

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Research shows there are many physical, cognitive, and social factors that influence health and well-being of an individual. These factors are especially prevalent during the period of adolescence. Further, the onset of many common psychiatric disorders occurs during adolescence¹. It is important that these symptoms are identified early and that individuals seek treatment soon after symptoms are identified, as this has been linked to better outcomes². Research shows that school-based programs can increase these help-seeking behaviors³.

The purpose of my research was to study the efficacy of a high school wellness fair program on tenth-grade student mental and physical health. The goals of these wellness fairs were to educate students about mental and physical health, increase help-seeking behavior among students, and decrease the stigma associated with mental health burdens.

The wellness fairs were hosted at four local high schools, including one private and three Title I schools. Title I schools are defined as having at least 40% of the students from low-income families receiving free or reduced meals⁴. A total of 146 students participated (62 males, 84 females, 10 gender not provided). This study was approved by the IRB (protocol #18-109 MR 1803); parental consent was obtained prior to each fair.

The fair consisted of physical fitness testing, mental health discussions, and a nutrition session. Students completed the FITNESSGRAM[®] physical fitness testing that consisted of anthropometrics (height, weight, body mass index [BMI]), body composition (% fat mass, % lean mass), resting heart rate, blood pressure, flexibility (shoulder stretch, sit-and-reach), muscular strength and endurance (push-ups, curl-ups), and aerobic capacity (Progressive Aerobic Cardiovascular Endurance Run [PACER]). Body composition was measured using a TANITA total body composition analyzer (SC-331S Total Body Composition Analyzer, TANITA) and blood

pressure and heart rate were measured via an Omron[®] automatic blood pressure monitor (5 Series Upper Arm Blood Pressure Monitor BP742N, Omron Healthcare).

The mental health discussions covered topics including managing stress, having balance between academics and extracurricular activities (school organizations, sports, home life, work), and developing healthy relationships among peers. These were facilitated by school counsellors, Auburn University faculty, Auburn University graduate students, as well as former and current professional athletes. The nutrition session varied among the different schools in how it was conducted and what information was included due to time constraints. One school participated in a brief discussion of the components of a healthy meal and completed activities to create healthy meals in line with the discussion. The other schools were provided with healthy snacks (e.g., fruits, vegetables, and whole grain snacks) and information about each food option when students selected snacks.

As part of the wellness fairs, participants completed self-report questionnaires both pre-fair and during the mental health discussions. Questionnaires included PROMIS[®] Pediatric Anxiety⁵, PROMIS Pediatric Depression⁵, PROMIS Psychological Stress^{6,7}, and PROMIS Physical Activity⁸. For the purpose of the present analysis, a limited set of dependent variables were assessed (i.e., questionnaires and BMI). A total of 37.5% of students reported moderate or severe anxiety symptoms, 31.25% reported moderate or severe depressive symptoms, 39% reported moderate or severe psychological stress symptoms, and 72% reported normal levels of physical activity. According to BMI, 16.4% of participants were overweight and 23.3% of participants were obese. In adolescents, BMI ranges are determined based on sex and age of the individual. Spearman correlations were used to examine bivariate relationships between BMI and the PROMIS measures.

A significant correlation was found between BMI and anxiety symptoms ($r = 0.32, p < 0.01$). A significant correlation was found between BMI and depressive symptoms ($r = 0.22, p = 0.03$). A significant correlation was found between BMI and psychological stress symptoms ($r = 0.22, p = 0.04$). No correlation was found between BMI and physical activity levels ($r = 0.02, p = 0.88$).

The present results indicate there is a significant relationship between body composition and mental health. In our sample, as BMI increased, self-reported mental health burdens increased. While other studies have not found this relationship to be significant, they have supported a trend towards this relationship, particularly for male adolescents⁹. In addition, these results are similar to findings which suggest that obesity negatively impacts body image, which in turn, impacts self-esteem, anxiety, and depression⁹. The present results add to this literature in that similar relationships were observed in a rural and at-risk population.

There was no relationship between BMI and self-report physical activity. This could be due to the inaccuracies in self-reported physical activity via questionnaires (i.e., overestimating physical activity levels). In comparison to self-reported measures, studies using quantitative measures of physical activity (i.e., accelerometry data) have observed significant associations between BMI and physical activity levels in adolescent samples¹⁰. Future studies should include quantitatively assessed physical activity via accelerometers, but these devices may be cost-prohibitive in large samples.

In the future, to further understand the relationship between physical and mental health, the physical fitness data collected during the wellness fairs will need to be analyzed. Additionally, by extending and replicating the wellness fairs in the future, we will increase our sample size, thereby improving our ability to analyze our data.

Statement of Research Advisor

Sarah Beth Dolinger is an undergraduate research fellow. Over the course of her first fellowship year, Sarah Beth was a major contributor to the management of the Wellness Fair program, including disseminating information to the schools, distributing and collecting

consent forms, as well as managing data collection and data archiving. She contributed to the data analysis for the present study and the interpretation of the study results. Sarah Beth has presented these results at the student research symposium at Auburn University, as well as at two national conferences (National Conference on Undergraduate Research and the annual meeting of the North American Society for Psychology of Sport and Physical Activity). Over the course of her second fellowship year, Sarah Beth will contribute to the replication and extension of this research project. She is currently evaluating data collected from the Wellness Fairs with respect to student athlete mental and physical health outcomes for publication.

– Melissa Pangelinan, *Kinesiology*

References

¹ Paus T, Keshavan M, Giedd JN. Why do many psychiatric disorders emerge during adolescence? *Nat Rev Neurosci*. 2008;9:947-957.

² Kessler RC, Avenevoli S, Costello J. Severity of 12-month DSM-IV disorders in the national comorbidity survey replication adolescent supplement. *Arch Gen Psychiatry*. 2012;69(4):381-389.

³ Milin R, Kutcher S, Lewis SP, et al. Impact of a mental health curriculum on knowledge and stigma among high school students: a randomized controlled trial. *J Am Acad Child Adolesc Psychiatry*. 2016;55(5):383-391.

⁴ Improving Basic Programs Operated by Local Educational Agencies (Title I, Part A). U.S. Department of Education. <https://www2.ed.gov/programstitleipart a/index.html>. Updated October 24, 2018. Accessed April 30, 2019.

⁵ Irwin DE, Stucky B, Langer MM, et al. An item response analysis of the pediatric PROMIS anxiety and depressive symptoms scales. *Qual Life Res*. 2010;19(4):595-607.

⁶ Bevans KB, Gardner W, Pajer KA, et al. Psychometric evaluation of the PROMIS® pediatric psychological and physical stress experiences measures. *J Pediatr Psychol*. 2018;43(6):678-692.

⁷ Bevans KB, Gardner W, Pajer K, Riley AW, Forrest CB. Qualitative development of the PROMIS® pediatric stress response item banks. *J Pediatr Psychol*. 2013;38(2):173-191.

⁸ Tucker CA, Bevans KB, Teneralli RE, Smith AW, Bowles HR, Forrest CB. Self-reported pediatric measures of physical activity, sedentary behavior and strength impact for PROMIS®: item development. *Pediatr Phys Ther*. 2014;26(4):385-392.

⁹ Fløtnes IS, Lund Nilsen TI, Augestad LB. Norwegian adolescents, physical activity and mental health: The Young-HUNT study. *Norsk Epidemiologi*. 2011;20(2):153-161.

¹⁰ Chung AE, Skinner AC, Steiner MJ, Perrin EM. Physical activity and BMI in a nationally representative sample of children and adolescents. *Clin Pediatr*. 2012;51(2):122-129.