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Isaac Kubalak

College of Saint Benedict/Saint John's University, ikubalak001@csbsju.edu

Allison Roe

College of Saint Benedict/Saint John's University, aroe002@csbsju.edu

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Daily Mindfulness Meditation and Exercise Impact Stress, Anxiety, and Mindfulness in Students During the Pandemic

Isaac Kubalak, Allison Roe, & Dr. Mary Stenson Ph.D.
College of Saint Benedict/Saint John's University
Exercise Science and Sports Studies Department

Introduction

- Exercise and meditation interventions show promising results in treatment for stress and anxiety.^{1,2,4,5,6}
- Levels of stress and anxiety, particularly regarding finances and health, were more pronounced during than prior to the pandemic in young adults.^{3,9}
- Previous research on group mindfulness interventions shows promising results for stress and anxiety in college students.¹⁰
- Both exercise and mindfulness meditation, involving deliberate awareness of one's feelings and environment, may enhance immunity and reduce inflammation.^{2,6,7,8}

Purpose

- Identify the effects of daily walking or daily mindfulness meditation on stress, anxiety, and mindfulness in college students over a six-week treatment period.
- Daily exercise or meditation will reduce stress and anxiety and enhance mindfulness.

Materials and Methods

Sixty-five college students (18-22 years; 84.7% identified as female; 87.3% as non-Hispanic/white) were assigned to three groups with varying assignments over the six-week intervention. Treatment began at the outset of the spring 2021 semester when COVID-19 cases were high:

- Control (N=22): nothing in addition to normal routine
- Exercise (N=24): daily 15-minute walk
- Mindfulness (N=19): daily 10-to-12-minute mindfulness meditation
- Participants completed Spielberger State Trait Anxiety Inventory (STAI), Perceived Stress Scale (PSS), and Five Facet Mindfulness Questionnaire (FFMQ) at baseline and after 6 weeks of intervention to analyze respective anxiety, stress, and mindfulness scores.
- Daily physical activity (PA) logs were completed by each group. Scores were found by multiplying time and intensity of exercise by number of days it was performed.
- All data was self-reported and collected electronically due to the pandemic.

Results

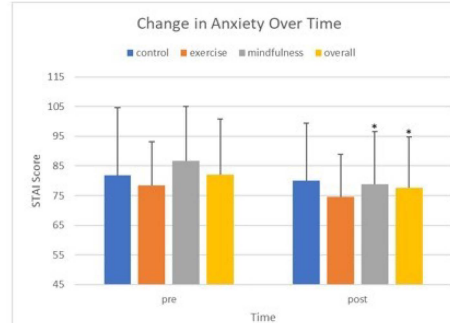


Figure 1. The change in anxiety for each group in pre- to post-test STAI surveys. The mindfulness ($p=0.010$) and overall/all participants groups ($p=0.008$) saw significant reductions in anxiety. Error bars represent standard deviation. (* indicates $p<0.05$)

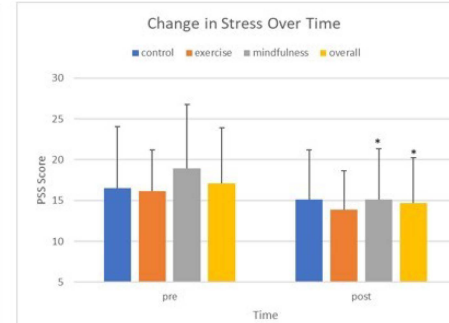


Figure 2. The change in stress for each group in pre- to post-test PSS surveys. The mindfulness ($p=0.007$) and overall/all participants groups ($p<0.001$) saw significant reductions in stress; the exercise group saw a non-significant reduction ($p=0.056$). Error bars represent standard deviation. (* indicates $p<0.05$)

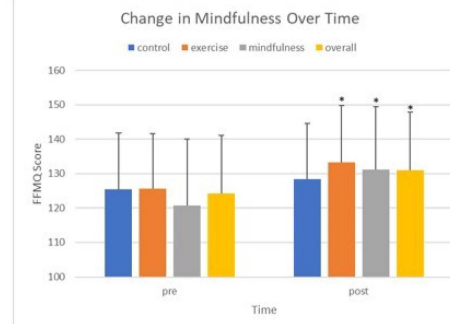


Figure 3. The change in mindfulness for each group in pre- to post-test FFMQ surveys. The exercise ($p=0.002$), mindfulness ($p=0.002$), and overall/all participants groups ($p<0.001$) saw significant improvements in scores. Error bars represent standard deviation. (* indicates $p<0.05$)

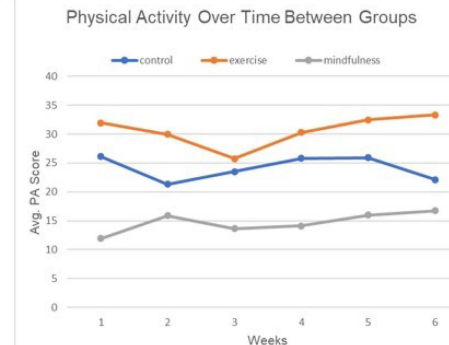


Figure 4. Average physical activity (PA) scores between groups over the six week intervention. PA was not significantly different between groups ($p=0.68$).

- Overall, there were significant improvements in stress ($t(64)=3.77$; $p<0.001$), anxiety ($t(64)=2.75$; $p<0.001$), and mindfulness ($t(63)=-4.69$; $p=0.004$) from baseline to post-test.
- The daily meditation group experienced a significant improvement in stress ($t(18)=3.07$; $p=.007$; $d=5.46$), anxiety ($t(18)=2.86$; $p=.010$; $d=12.1$), and mindfulness ($t(17)=-3.62$; $p=.002$; $d=12.1$).
- The daily walking group experienced a significant increase in mindfulness ($t(23)=-3.41$; $p=.002$; $d=11.0$).
- The control group experienced no significant changes in stress ($t(21)=1.45$; $p=.162$; $d=4.71$), anxiety ($t(21)=-.683$; $p=.502$; $d=12.8$), nor mindfulness ($t(21)=-1.25$; $p=.225$; $d=11.3$).
- There were no significant interactions between time and group for stress ($F(2,62)=1.12$; $p=.334$), anxiety ($F(2,62)=1.16$; $p=.319$), nor mindfulness ($F(2,61)=2.15$; $p=.125$).
- Physical activity was not significantly different between groups over time ($F(7,13,214)=.694$; $p=.680$).

Discussion

- Six weeks of daily mindfulness meditation resulted in a significant improvement in stress, anxiety, and mindfulness; daily walking significantly increased mindfulness.
- Previous researchers have found that mindfulness meditation enhances immunity and downregulates stress axes, including the hypothalamic-pituitary-adrenal (HPA) axis, creating both physiological and anxiolytic benefits.^{2,8,9}
- There was no significant improvement in stress nor anxiety with six weeks of daily walking.
- Other researchers found that anxiolytic effects have been observed after frequent low-moderate intensity exercise.¹⁷ While our participants in the exercise group exercised more than the other groups, they may not have done enough exercise or as intense of exercise to produce a significant effect.
- The significant improvements in stress, anxiety, and mindfulness for all participants (overall) could be affected by reduced chances of leaving campus (a stressful possibility at the time) due to the pandemic as the spring 2021 semester continued.
- This research is limited by self-reporting of data and inconsistent participant compliance. Regarding exercise limitations, participants likely needed a stronger exercise intervention to reduce anxiety and stress since many were already active prior to the study.
- Future research should provide more objective measures of physical activity and investigate different forms of exercise and types of meditation on stress, anxiety, and mindfulness.

Conclusion

- Six weeks of mindfulness meditation improved stress, anxiety, and mindfulness in college students during the COVID-19 pandemic.

Literature Cited

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Acknowledgments

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