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**Abstract Title**

Longitudinal effects of an app-based mental health program on wearable device-derived outcomes in caregivers at-risk for depression and anxiety

## Authors

| Name          | Role      | Profession          |
|---------------|-----------|---------------------|
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**Background**

App-based mental health programs are known to improve parent mental health. However, little research has examined their effect on physical health, another important aspect of well-being.

**Objective**

This project examined whether the app-based BEAM program improved heart rate (HR), sleep, and step count across the intervention compared to a control condition. A second question evaluated baseline mental health and sociodemographic moderators of change.

**Methods**

Physical health outcomes were collected across the 76-day BEAM program via participant-worn Fitbit Inspire 2 devices (N = 100) in a naturalistic setting and analyzed at the day-level. Mixed-modelling in R assessed change in HR, sleep, and step count across time. Models first optimized fixed effects of time, then random effects of time, and finally added moderators in a data-driven manner.

**Results**

Overall, HR ( $b=0.04$ ,  $p<.001$ ) and sleep ( $b=-0.06$ ,  $p<.001$ ) followed a quadratic pattern, and steps varied following a cubic pattern ( $b=-0.09$ ,  $p<.001$ ). Results also indicate no time $\times$ group interaction on outcomes, suggesting those in BEAM experienced similar physiology across time to those in the control ( $p's>.05$ ). Several baseline mental health characteristics did moderate change; those with higher baseline parental overreactivity demonstrated greater linear reductions in HR ( $b=-0.05$ ,  $p=.017$ ). Depression ( $b=-0.20$ ,  $p<.001$ ) and sleep concerns ( $b=-0.15$ ,  $p=.022$ ) were associated with greater reductions in sleep time. There were no significant moderators of step count.

**Conclusion**

Results indicate no improvements in HR, sleep, or step count for participants enrolled in BEAM compared to controls. This is not surprising given the intervention did not directly target physical health. There appeared to be several sociodemographic predictors of change in both HR and sleep, but not for step count. These findings highlight potential areas of improvement for the BEAM program in addition to contributing to the literature on the efficacy of eHealth programs and the relationship between our mental and physical health.